California High-Speed Train Project

Request for Proposal
for Design-Build Services

RFP No.: HSR 11-16
Geotechnical Data Report
Clinton Ave to East American Ave

Appendix E
Laboratory Test Records - Sierra Testing Laboratories, Inc

Prepared for

Appendix E
Laboratory Test Records —
Sierra Testing Laboratories, Inc.

Table E-1
Summary of Laboratory Testing Program

Test Type	ASTM Standard	No. of Tests
Moisture Test	D 2216	123
Atterberg Limit	D 4318	71
Organics	D 2974	42
Particle-Size Analysis	D 422	65
Soils Finer than the No. 200 Sieve	D 1140	287
Remolded Direct Shear	D 3080	50
Soil Resistivity	G 57	37
Soil Corrosivity (pH, Chloride, Sulfate)	D 4327	37
Modified Proctor	D 1557	9
California Bearing Ratio	D 1883	9
Groundwater Chemistry (pH, Calcium, $CaCO_3$, Specific Conductance, Total Dissolved Solids, Chloride, Sulfate)	SM 4500-H$^+$B, EPA 200.7, SM 2320B, SM 2510B, EPA 300.0	3

Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0001R	S01	0.0	5.0	2.5	284.9	SM					31.9	
S0001R	S03	6.5	8.0	7.3	280.1	SM					21.2	
S0001R	S04	8.0	9.5	8.8	278.6	SP-SM					8.7	
S0001R	S06B	11.0	11.5	11.3	276.1	ML					69.4	
S0001R	S07	12.5	14.0	13.3	274.1	SM					40.4	
S0001R	S07	12.5	14.0	13.3	274.1	SM					32.4	
S0001R	S08	14.0	15.5	14.8	272.6	SM					35.2	
S0001R	S09	20.0	21.5	20.8	266.6	ML		21	18	3	63.7	1.4
S0001R	S10	25.0	26.5	25.8	261.6	CL-ML	13.1	18	14	4	50.7	2.4
S0001R	S11	30.0	30.8	30.4	257.0	SM					28.9	
S0001R	S13	40.0	41.2	40.6	246.8	SP					0.1	
S0001R	S14	45.0	46.5	45.8	241.6	CL	31.9	37	23	14	97.2	2.9
S0001R	S15	50.0	51.5	50.8	236.6	CL-ML	22.8	26	21	5	90.2	1.2
S0002R	S01	0.0	5.0	2.5	287.9	SM					23.8	
S0002R	S02	5.0	6.3	5.7	284.7	SM	3.9				19.5	
S0002R	S04	8.0	9.3	8.7	281.7	SM	10.5				42.3	
S0002R	S04	8.0	9.3	8.7	281.7	SM					41.3	
S0002R	S05A	9.5	10.3	9.9	280.5	SM	15.1				29.0	
S0002R	S08	14.0	15.2	14.6	275.8	SP					2.8	
S0002R	S09	20.0	21.3	20.6	269.8	SP	14.8				3.5	
S0002R	S10	25.0	26.2	25.6	264.8	SM					15.7	
S0002R	S11	30.0	31.3	30.7	259.7	SM	15.0				43.5	
S0002R	S11	30.0	31.3	30.7	259.7	SM					45.6	
S0002R	S12	35.0	36.4	35.7	254.7	ML	28.6	32	29	3	86.4	2.2

Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0002R	S13	40.0	41.3	40.7	249.7	CL-ML	16.5	22	15	7	52.0	2.1
S0002R	S14	45.0	46.4	45.7	244.7	ML	29.2	24	24	NP	81.7	
S0002R	S14	45.0	46.4	45.7	244.7	ML	27.9					2.4
S0002R	S15B	50.8	51.3	51.1	239.3	ML	29.8				65.7	
S0002R	S17B	60.6	60.9	60.8	229.6	SM	12.5				49.3	
S0002R	S19	70.0	71.5	70.8	219.6	ML	31.7	31	24	7	82.4	
S0002R	S19	70.0	71.5	70.8	219.6	ML	30.5					3.3
S0002R	S21A	80.0	80.7	80.4	210.0	ML					65.4	
S0002R	S21B	80.7	81.4	81.1	209.3							
S0003R	S01	0.0	5.0	2.5	285.5	SM					24.1	
S0003R	S03B	7.2	8.5	7.9	280.1	SM					43.1	
S0003R	S03B	7.2	8.5	7.9	280.1	SM					44.9	
S0003R	S04	8.0	9.0	8.5	279.5	ML					89.7	
S0003R	S05	9.5	11.0	10.3	277.7	CL	18.5	28	16	12	58.3	3.0
S0003R	S06	11.0	12.5	11.8	276.2	ML	24.7	32	26	6	69.4	1.9
S0003R	S08	14.0	15.2	14.6	273.4	SP-SM					10.2	
S0003R	S09	20.0	21.5	20.8	267.2	ML		24	23	1	91.2	1.3
S0003R	S10	25.0	26.4	25.7	262.3	SP-SM					8.7	
S0003R	S11	30.0	30.9	30.5	257.5	SP-SM					6.5	
S0003R	S12	35.0	36.5	35.8	252.2	CL-ML	23.8	28	22	6	88.3	2.3
S0003R	S13	40.0	41.5	40.8	247.2	CL-ML	15.5	17	13	4	53.6	2.3
S0003R	S15	50.0	50.8	50.4	237.6	SP-SM					11.5	
S0003R	S16B	55.4	56.5	56.0	232.0	ML		22	19	3	85.7	1.9
S0003R	S17	60.0	61.5	60.8	227.2	CL-ML	18.6	21	16	5	50.7	3.4

CALIFORNIA High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth	Bottom Depth	Test Depth	Elevation (NAVD88)	USCS Group	Moisture Content, w_n	Liquid Limit, w_l	Plastic Limit, w_p	Plasticity Index, I_p	Percent Fines	Organic Content
		(ft)	(ft)	(ft)	(ft)		(%)	(%)	(%)	(%)	(%)	(%)
S0003R	S19	70.0	71.5	70.8	217.2	SM					41.7	
S0003R	S20	75.0	76.5	75.8	212.2	ML	29.5	NP	NP	NP	91.6	1.8
S0004R	S01	0.0	5.0	2.5	281.2	ML					51.8	
S0004R	S03	6.5	7.9	7.2	276.5	ML	25.2	27	26	1	59.9	3.1
S0004R	S04	8.0	9.4	8.7	275.0	SM					24.0	
S0004R	S05A	9.5	10.5	10.0	273.7	CL	18.4	25	17	8	55.8	2.6
S0004R	S06B	11.6	12.5	12.1	271.6	ML	10.3	17	15	2	52.1	1.7
S0004R	S07	12.5	13.1	12.8	270.9	CL-ML	12.8	19	15	4	65.4	2.0
S0004R	S08	14.0	15.5	14.8	268.9	ML	16.1	19	17	2	65.5	1.4
S0004R	S09	20.0	21.5	20.8	262.9	ML					89.8	
S0004R	S10B	25.6	25.9	25.8	257.9	ML	19.2				79.0	
S0004R	S11	30.0	31.4	30.7	253.0	SM					28.4	
S0004R	S11	30.0	31.4	30.7	253.0	ML					82.8	
S0004R	S12	35.0	36.3	35.7	248.0	SM					32.1	
S0004R	S13	40.0	41.0	40.5	243.2	ML					63.4	
S0004R	S14	45.0	45.9	45.5	238.2	CL-ML	20.2	22	17	5	60.5	2.3
S0004R	S17B	53.9	54.4	54.2	229.5	ML	30.1				96.9	
S0004R	S18B	54.5	55.8	55.2	228.5	ML	35.7	39	29	10	82.9	
S0004R	S20B	65.2	66.3	65.8	217.9	CL-ML	24.6	26	19	7	67.3	2.1
S0004R	S21	70.0	70.9	70.5	213.2	ML	31.5	33	25	8	55.5	
S0004R	S21	70.0	70.9	70.5	213.2	ML	30.5					2.3
S0005R	S01	0.0	5.0	2.5	282.8	SP-SM						
S0005R	S02	5.0	6.5	5.8	279.5	SP-SM					13.8	
S0005R	S05	9.5	11.0	10.3	275.0	ML	21.1	26	22	4	59.7	1.9

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Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0005R	S06	11.0	12.5	11.8	273.5	ML	21.8	23	20	3	57.6	1.5
S0005R	S07	12.5	14.0	13.3	272.0	CL-ML	18.4	23	18	5	67.7	2.1
S0005R	S08	14.0	14.5	14.3	271.0	ML					54.7	
S0005R	S09	20.0	20.8	20.4	264.9	SM					17.5	
S0005R	S10	25.0	25.8	25.4	259.9	ML					91.9	
S0005R	S11B	30.6	31.5	31.1	254.2	CL-ML	17.0	25	18	7	74.4	2.7
S0005R	S12	35.0	36.2	35.6	249.7	SP-SM					7.3	
S0005R	S13	40.0	41.5	40.8	244.5	ML	24.3	33	27	6	59.5	5.1
S0005R	S14	45.0	46.5	45.8	239.5	ML	33.1	36	27	9	79.7	3.5
S0005R	S15	46.5	47.5	47.0	238.3	ML					56.6	
S0005R	S15	46.5	47.5	47.0	238.3	ML					62.3	0.0
S0005R	S17	49.5	51.0	50.3	235.0	CL-ML	19.8	24	20	4	64.5	1.8
S0005R	S18	55.0	56.3	55.7	229.6	SP-SM					9.0	
S0005R	S21	70.0	71.5	70.8	214.5	SM					16.0	
S0005R	S21	70.0	71.5	70.8	214.5	SM					38.2	
S0005R	S23	80.0	80.5	80.3	205.0	ML					74.9	
S0006R	S06	0.0	5.0	2.5	285.1	SP-SM					13.9	
S0006R	S04	8.0	9.3	8.7	278.9	SM					43.8	
S0006R	S08	14.0	15.2	14.6	273.0	ML	21.9				68.2	
S0006R	S09	20.0	21.3	20.7	266.9	ML					75.2	
S0006R	S10	25.0	26.2	25.6	262.0	ML	22.8				77.4	
S0006R	S11	30.0	31.4	30.7	256.9	SM					20.7	
S0006R	S13	36.5	38.0	37.3	250.3	ML	25.8				71.5	
S0006R	S14	38.0	39.4	38.7	248.9	SM	15.3				32.6	

CALIFORNIA High-Speed Rail Authority

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Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0006R	S14	38.0	39.4	38.7	248.9	SM					32.7	
S0006R	S15	39.5	40.8	40.2	247.4	SM	11.2				39.5	
S0006R	S16	45.0	46.1	45.6	242.0	SP-SM					10.6	
S0006R	S17	50.0	51.2	50.6	237.0	SP-SM	14.2				6.4	
S0007R	S01	0.0	5.0	2.5	282.6	SM					30.8	
S0007R	S04	5.0	6.3	5.7	279.4	SM	10.3				32.6	
S0007R	S03	6.5	8.0	7.3	277.8	SM	11.1				37.2	
S0007R	S06	9.0	10.3	9.7	275.4	SM	13.6				30.9	
S0007R	S07	12.5	14.0	13.3	271.8	SM	19.9				30.4	
S0007R	S08	14.0	15.3	14.7	270.4	SM	14.1				40.7	
S0007R	S09	20.0	21.1	20.6	264.5	SP-SM					7.4	
S0007R	S09	20.0	21.1	20.6	264.5	SM					30.4	
S0007R	S11A	30.0	30.5	30.3	254.8	ML	29.7				84.2	
S0007R	S11B	30.5	31.4	31.0	254.1	SM	14.1				43.9	
S0007R	S12	35.0	36.2	35.6	249.5	SM					30.5	
S0007R	S13B	40.8	41.4	41.1	244.0	CL	17.8	41	15	26	74.8	
S0007R	S14	45.0	46.3	45.7	239.4	ML	28.6				68.2	
S0007R	S15	50.0	51.3	50.7	234.4	SM					17.6	
S0007R	S16B	55.8	56.5	56.2	228.9	ML					59.5	
S0007R	S17	60.0	61.5	60.8	224.3	SM	17.5				41.0	
S0007R	S18	65.0	66.5	65.8	219.3	ML	17.9				50.1	
S0007R	S20	75.0	76.2	75.6	209.5	ML	22.4				51.5	
S0007R	S21	80.0	81.1	80.6	204.5	ML	29.3				77.3	
S0010R	S01	0.0	5.0	2.5	283.6	SM					22.3	

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Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0010R	S02	5.0	6.5	5.8	280.3	SM	4.8				24.4	
S0010R	S04	8.0	9.4	8.7	277.4	ML	15.9				57.0	
S0010R	S05	9.5	10.9	10.2	275.9	CL-ML		27	22	5	52.9	3.2
S0010R	S06	11.0	12.4	11.7	274.4	SM	16.4				41.7	
S0010R	S07	12.5	13.2	12.9	273.2	CL-ML		29	22	7	58.9	1.5
S0010R	S07	12.5	13.2	12.9	273.2						15.2	
S0010R	S09	20.0	21.3	20.7	265.4	SM	16.9				36.5	
S0010R	S09	20.0	21.3	20.7	265.4	ML					57.1	
S0010R	S10	25.0	26.5	25.8	260.3	ML	30.8	35	25	10	94.6	
S0010R	S11	30.0	31.2	30.6	255.5	SM	20.9				23.7	
S0010R	S12	35.0	36.4	35.7	250.4	SM	17.4				22.7	
S0010R	S13	35.0	36.4	35.7	250.4	SM					15.2	
S0010R	S13	40.0	41.5	40.8	245.3	SP-SM					6.7	
S0010R	S14	45.0	46.3	45.7	240.4	CL	15.2	24	14	10	50.3	
S0010R	S14	45.0	46.3	45.7	240.4	CL	15.7					3.1
S0010R	S15	50.0	51.3	50.7	235.4	CL		30	21	9	75.1	1.5
S0010R	S16	55.0	56.5	55.8	230.3	CL	31.7	41	24	17	78.3	
S0010R	S17	60.0	61.3	60.7	225.4	CL	23.0	25	17	8	64.5	1.9
S0010R	S18	65.0	66.4	65.7	220.4	CL	21.7	43	17	26	63.5	5.8
S0010R	S21	80.0	81.5	80.8	205.3	ML	28.4	25	23	2	58.0	1.8
S0010R	S22	85.0	86.4	85.7	200.4	ML	31.3	27	26	1	74.5	1.6
S0010R	S23	90.0	91.3	90.7	195.4	ML					66.5	
S0010R	S25	100.0	101.3	100.7	185.4	SP-SM	18.9				13.9	
S0010R	S26A	105.0	106.0	105.5	180.6	ML					77.1	

Table E-2
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Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0010R	S27	110.0	111.5	110.8	175.3	SM					31.9	
S0010R	S30	125.0	126.2	125.6	160.5	ML	36.9	44	32	12	70.0	
S0010R	S31	130.0	131.5	130.8	155.3	SM					46.3	
S0010R	S35	150.0	151.5	150.8	135.3	SM	36.8				30.8	
S0012R	S01	0.0	5.0	2.5	285.1	SM					18.2	
S0012R	S02	5.0	6.5	5.8	281.8	SM	6.1				20.2	
S0012R	S03	6.5	7.7	7.1	280.5	SM	12.0				18.3	
S0012R	S05	9.5	10.9	10.2	277.4	ML	24.4				73.7	
S0012R	S06	11.0	12.5	11.8	275.8	ML	27.3				65.7	
S0012R	S07	12.5	13.8	13.2	274.4	SM	15.5				21.4	
S0012R	S08	14.0	15.4	14.7	272.9	SM	26.1				37.0	
S0012R	S09A	20.0	21.0	20.5	267.1	ML	33.2				97.3	
S0012R	S09B	21	21.4	21.2	266.4	SM					68.4	
S0012R	S12	35.0	36.2	35.6	252.0	SP-SM					6.8	
S0012R	S13	40.0	41.4	40.7	246.9	SM					26.3	
S0012R	S14	45.0	46.4	45.7	241.9	SP-SM	14.8				14.0	
S0012R	S15	50.0	51.5	50.8	236.8	SM	18.5				48.5	
S0012R	S16	55.0	56.4	55.7	231.9	SP-SM					8.1	
S0012R	S17	60.0	61.3	60.7	226.9	SP-SM					6.4	
S0012R	S19	70.0	71.5	70.8	216.8	ML	16.2				50.1	
S0012R	S20	75.0	75.8	75.4	212.2	SM	24.6				28.8	
S0012R	S21	80.0	81.2	80.6	207.0	ML	29.3				74.0	
S0012R	S22	85.5	86.3	85.9	201.7	ML					73.8	
S0012R	S23	90.0	91.5	90.8	196.8	SM	30.1				16.2	

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Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0012R	S24	95.0	96.3	95.7	191.9	ML					67.8	
S0012R	S26	105.0	106.5	105.8	181.8	ML	29.9				79.4	
S0012R	S27	110.0	111.5	110.8	176.8	ML					73.3	
S0012R	S28	115.0	116.5	115.8	171.8	SM					29.8	
S0012R	S30	125.0	126.5	125.8	161.8	SM	43.5				30.7	
S0012R	S32A	135.0	135.8	135.4	152.2	ML	27.2				56.9	
S0012R	S33	140.0	141.4	140.7	146.9	ML	32.8	40	30	10	86.5	
S0012R	S35	150.0	151.4	150.7	135.4	ML	36.0				61.8	
S0013AR	S01	0.0	5.0	2.5	283.6	SM					48.3	
S0013AR	S03	6.5	7.2	6.9	279.2	SM	10.1				30.8	
S0013AR	S04	8.0	8.8	8.4	277.7	SM	12.0				28.3	
S0013AR	S05	9.5	10.5	10.0	276.1	ML	23.8				65.8	
S0013AR	S06A	11.0	11.7	11.4	274.7	SM	16.3				47.1	
S0013AR	S06B	11.7	12.5	12.1	274.0	ML					65.4	
S0013AR	S07	12.5	13.5	13.0	273.1	ML	18.5				75.1	
S0013AR	S08	14.0	15.0	14.5	271.6	ML	16.2				73.9	
S0013AR	S09	20.0	21.4	20.7	265.4	ML					76.5	
S0013AR	S10	25.0	26.2	25.6	260.5	ML	24.5				78.6	
S0013AR	S11	30.0	31.5	30.8	255.3	ML	21.7				62.4	
S0013AR	S12	35.0	36.5	35.8	250.3	ML					67.6	
S0013AR	S13	40.0	41.5	40.8	245.3	ML	26.6				84.7	
S0013AR	S14	45.0	45.9	45.5	240.6	SM	15.0				38.0	
S0013AR	S16	55.0	56.2	55.6	230.5	ML					77.0	
S0013AR	S17	60.0	61.2	60.6	225.5	ML	24.3				71.8	

Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0013AR	S19	70.0	71.5	70.8	215.3	SM					19.4	
S0013AR	S21	80.0	80.9	80.5	205.6	ML	23.0				60.6	
S0013AR	S24	95.0	95.8	95.4	190.7	ML					90.9	
S0013AR	S26	105.0	105.9	105.5	180.6	SM	17.4				34.4	
S0013AR	S27	110.0	111.3	110.7	175.4	ML					67.1	
S0013AR	S28	115.0	115.9	115.5	170.6	ML	26.8				54.3	
S0013AR	S30	125.0	126.1	125.6	160.5	ML					73.0	
S0013AR	S32	135.0	136.3	135.7	150.4	ML					65.0	
S0014AR	S01	0.0	5.0	2.5	282.9	ML					67.7	
S0014AR	S02	5.0	6.5	5.8	279.6	ML	17.4				53.5	
S0014AR	S03	6.5	7.8	7.2	278.2	SM	14.9				40.9	
S0014AR	S04	8.0	9.2	8.6	276.8	SM	16.0				44.4	1.9
S0014AR	S05	9.5	11.0	10.3	275.1	CL	21.3	27	17	10	59.1	
S0014AR	S06	11.0	12.2	11.6	273.8	SM	14.9				29.7	
S0014AR	S07	12.5	13.8	13.2	272.2	CL	21.4	65	16	49	58.9	3.4
S0014AR	S08	14.0	15.2	14.6	270.8	SM					21.6	
S0014AR	S09	20.0	21.3	20.7	264.8	SM	8.2				43.8	
S0014AR	S10	25.0	26.2	25.6	259.8	SM					25.3	
S0014AR	S11	30.0	31.2	30.6	254.8	SP-SM	12.3				6.0	
S0014AR	S12	35.0	36.5	35.8	249.6	SM	12.0				33.9	
S0014AR	S13	40.0	41.4	40.7	244.7	CL	16.9	30	11	19	60.8	
S0014AR	S14	45.0	46.5	45.8	239.6	ML	16.4	28	11	17	55.2	
S0014AR	S15	50.0	51.4	50.7	234.7	SM	19.3				42.1	
S0014AR	S17	60.0	61.5	60.8	224.6	ML	24.2				65.6	

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Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0014AR	S18	65.0	66.5	65.8	219.6	SM					37.1	
S0014AR	S19	70.0	71.4	70.7	214.7	SM	14.9				49.8	
S0014AR	S20	75.0	76.5	75.8	209.6	ML	22.7				58.5	
S0014R	S01	0.0	5.0	2.5	282.1	ML					53.7	
S0014R	S02	5.0	6.5	5.8	278.8	SM	7.5				17.5	
S0014R	S03	6.5	7.8	7.2	277.4	SM	11.1				21.5	
S0014R	S04	8.0	9.3	8.7	275.9	CL-ML	19.9	21	16	5	53.9	
S0014R	S05	9.5	10.7	10.1	274.5	SM	16.5				47.2	
S0014R	S06	11.0	12.2	11.6	273.0	CL-ML	19.3	28	16	12	70.6	
S0014R	S06	11.0	12.3	11.7	272.9	SP-SM	19.3				15.0	
S0014R	S07	12.5	13.9	13.2	271.4	SP-SM	20.1				59.0	
S0014R	S08	14.0	15.2	14.6	270.0	ML					60.2	
S0014R	S10	25.0	26.4	25.7	258.9	SM	12.6	NP	NP	NP	43.9	
S0014R	S11	30.0	31.2	30.6	254.0	SP						
S0014R	S12	35.0	36.5	35.8	248.8	CL		27	15	12	60.5	
S0014R	S13	40.0	41.4	40.7	243.9	SM	22.7				47.9	
S0014R	S14	45.0	46.5	45.8	238.8	SM		28	11	17	49.4	
S0014R	S15	50.0	51.5	50.8	233.8	ML	33.5	33	31	2	59.5	
S0014R	S16	55.0	56.4	55.7	228.9	CL-ML	29.4	27	22	5	75.1	
S0014R	S17	60.0	61.2	60.6	224.0	SP-SM					11.1	
S0014R	S18B	65.5	66.7	66.1	218.5	SM					37.8	
S0015R	S01	0.0	5.0	2.5	284.2	SM					34.5	
S0015R	S02	5.0	6.5	5.8	280.9	SM	7.0				20.9	
S0015R	S03A*	6.5	7.0	6.8	279.9	SM	14.3				16.7	

Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth	Bottom Depth	Test Depth	Elevation (NAVD88)	USCS Group	Moisture Content, w_n	Liquid Limit, w_l	Plastic Limit, w_p	Plasticity Index, I_p	Percent Fines	Organic Content
		(ft)	(ft)	(ft)	(ft)		(%)	(%)	(%)	(%)	(%)	(%)
S0015R	S04	8.0	9.5	8.8	277.9	SM	19.7				33.9	
S0015R	S05	9.5	11.0	10.3	276.4	SM					31.6	
S0015R	S06B	11.4	12.5	12.0	274.7	ML	19.9				56.9	
S0015R	S07B	12.9	13.8	13.4	273.3	CL-ML		24	20	4	72.5	
S0015R	S08	14.0	15.5	14.8	271.9	ML	21.7	23	18	5	75.7	
S0015R	S09A	20.0	20.3	20.2	266.5	SM	15.6				44.3	
S0015R	S10	25.0	26.5	25.8	260.9	SM	22.1				30.8	
S0015R	S11A	30.0	30.7	30.4	256.3	SP-SM	21.2				6.5	
S0015R	S11B	30.7	31.0	30.9	255.8	ML					85.5	
S0015R	S12B	35.6	36.4	36.0	250.7	ML	17.5				56.4	
S0015R	S13	40.0	41.2	40.6	246.1	SM	17.5				49.8	
S0015R	S15A	50.0	50.6	50.3	236.4	CL-ML		25	21	4	91.9	
S0016R	S01	0.0	5.0	2.5	286.3	ML					61.1	
S0016R	S02	5.0	6.0	5.5	283.3	ML	11.8	19	16	3	62.5	
S0016R	S03	10.0	11.3	10.7	278.1	SM	11.9				30.0	
S0016R	S04	15.0	16.3	15.7	273.1	SM					24.4	
S0016R	S05	20.0	21.3	20.7	268.1	SM	11.7				36.5	
S0016R	S06	25.0	26.1	25.6	263.2	SP-SM					6.1	
S0016R	S08	35.0	35.9	35.5	253.3	SP-SM	15.2				7.1	
S0016R	S09	40.0	40.9	40.5	248.3	SP-SM					14.4	
S0016R	S10	45.0	46.2	45.6	243.2	SM					17.9	
S0016R	S11A	50.0	50.8	50.4	238.4	SM	15.3				37.6	
S0016R	S11B	50.8	51.5	51.2	237.6	CL	23.7	30	16	14	73.3	
S0016R	S12	55.0	56.1	55.6	233.2	SM	13.5				33.3	

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Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0016R	S13	60.0	61.5	60.8	228.0	SM	14.9				42.7	
S0016R	S14	65.0	65.9	65.5	223.3	SP-SM	15.5				9.0	
S0016R	S15	70.0	71.5	70.8	218.0	ML	20.0				52.7	
S0016R	S16	75.0	76.2	75.6	213.2	ML	24.9	22	20	2	64.4	
S0016R	S17	80.0	81.5	80.8	208.0	SM	22.0				46.3	
S0016R	S18	85.0	86.3	85.7	203.1	SP-SM					10.3	
S0016R	S19	90.0	91.5	90.8	198.0	SM	15.6				43.7	
S0016R	S20	95.0	96.5	95.8	193.0	SM	18.7				26.9	
S0016R	S21B	100.8	101.2	101.2	187.6	SP-SM	19.7				12.4	
S0016R	S22	105.0	106.0	105.5	183.3	SP-SM					7.7	
S0016R	S23A	110.0	110.8	20.3	268.5	SP-SM					12.5	
S0016R	S23B	110.8	111.5	111.2	177.6	SM	25.9				44.7	
S0016R	S24	115.0	116.5	115.8	173.0	ML	20.3				55.3	
S0016R	S25	120.0	121.5	120.8	168.0	CL	32.7	38	23	15	88.0	
S0016R	S26	125.0	126.0	125.5	163.3	ML	25.3				51.6	
S0016R	S27	130.0	131.5	130.8	158.0	SM					40.6	
S0016R	S28	135.0	136.3	135.7	153.1	SP-SM	33.5				12.4	
S0016R	S29	140.0	141.2	140.6	148.2	SP-SM	32.7				9.7	
S0016R	S31	150.0	151.5	150.8	138.0	SM	30.8				20.2	
S0017R	S01	0.0	5.0	2.5	288.0	SM					43.3	
S0017R	S02	5.0	6.5	5.8	284.7	ML					64.7	
S0017R	S04A	15.0	15.6	15.3	275.2	ML					74.3	
S0017R	S05	20.0	21.2	20.6	269.9	CL-ML		21	17	4	72.1	
S0017R	S06	25.0	26.0	25.5	265.0	SP-SM					13.5	

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Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0017R	S07	30.0	31.3	30.7	259.8	SM					7.7	
S0017R	S09	40.0	40.7	40.4	250.1	ML		22	19	3	62.4	
S0017R	S10	45.0	46.0	45.5	245.0	SM					31.6	
S0017R	S11	50.0	50.5	50.3	240.2	SM					46.2	
S0017R	S12	55.0	55.7	55.4	235.1	SM					22.3	
S0017R	S13	60.0	61.2	60.6	229.9	SM					30.2	
S0017R	S15	70.0	71.0	70.5	220.0	ML					61.7	
S0017R	S16	75.0	76.4	75.7	214.8	SM					45.1	
S0017R	S17A	80.0	80.3	80.2	210.3	CL		27	23	4	85.1	
S0017R	S17B	80.3	80.9	80.6	209.9	ML					56.0	
S0017R	S18A	85.0	85.5	85.3	205.2	SM					17.7	
S0017R	S18B	85.5	86.3	85.9	204.6	ML					51.7	
S0017R	S19	90.0	91.0	90.5	200.0	SM					36.2	
S0017R	S20	95.0	95.8	95.4	195.1	CL					59.3	
S0017R	S21	100.0	100.9	100.5	190.0	SC					43.1	
S0017R	S22	105.0	106.4	105.7	184.8	ML					58.3	
S0017R	S24	115.0	116.3	115.7	174.8	SM					26.4	
S0017R	S25	120.0	121.2	120.6	169.9	CL		27	17	10	76.4	
S0017R	S29A	140.0	140.5	140.3	150.2	ML		40	26	14	70.9	
S0017R	S30	145.0	146.0	145.5	145.0	ML					73.3	
S0017R	S31	150.0	151.5	150.8	139.7	ML					58.9	
S0018R	S01	0.0	5.0	2.5	303.3	SM					40.1	
S0018R	S02	5.0	6.5	5.8	300.0	CL-ML	10.1				54.8	
S0018R	S03	10.0	11.2	10.6	295.2	SM	14.4				43.5	

Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth (ft)	Bottom Depth (ft)	Test Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_n (%)	Liquid Limit, w_l (%)	Plastic Limit, w_p (%)	Plasticity Index, I_p (%)	Percent Fines (%)	Organic Content (%)
S0018R	S04	15.0	16.3	15.7	290.1	SM	11.8				48.8	
S0018R	S05	20.0	21.0	20.5	285.3	SM	13.1				38.0	
S0018R	S06	25.0	26.2	25.6	280.2	CL-ML	24.9	22	18	4	76.9	
S0018R	S07	30.0	31.2	30.6	275.2	SM					25.3	
S0018R	S08	35.0	36.3	35.7	270.1	SP-SM					13.4	
S0018R	S09	40.0	41.1	40.6	265.2	SP-SM	18.1				7.1	
S0018R	S10	45.0	45.8	45.4	260.4	SP-SM	12.4				9.5	
S0018R	S11A	50.0	50.5	50.3	255.5	ML					83.1	
S0018R	S12	55.0	55.7	55.4	250.4	SP-SM					11.1	
S0018R	S13	60.0	60.8	60.4	245.4	SM	15.1				39.0	
S0018R	S14	65.0	65.7	65.4	240.4	SP-SM	12.4				11.1	
S0018R	S15	70.0	71.2	70.6	235.2	SM	12.9				22.2	
S0018R	S16	75.0	75.6	75.3	230.5	SM	13.5				32.9	
S0018R	S17	80.0	81.2	80.6	225.2	SP-SM	16.7				9.4	
S0018R	S18	85.0	86.4	85.7	220.1	ML	20.4				53.3	
S0018R	S19A	90.0	90.4	90.2	215.6	ML	30.2				84.9	
S0018R	S19B	90.4	91.2	90.8	215.0	ML	27.1				69.5	
S0018R	S20	95.0	96.0	95.5	210.3	SM	13.5				23.8	
S0018R	S21	100.0	100.9	100.5	205.3	SM	16.9				27.8	2.1
S0018R	S22	105.0	106.0	105.5	200.3	SM					37.0	
S0018R	S23	110.0	111.2	110.6	195.2	SM	17.0				38.1	
S0018R	S25	120.0	120.8	120.4	185.4	ML					57.4	
S0018R	S26	125.0	125.8	125.4	180.4	SM					16.6	
S0018R	S27	130.0	130.9	130.5	175.3	SM	21.5				23.8	

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Table E-2
Summary of Laboratory Index Test Results

Borehole ID	Sample No.	Top Depth	Bottom Depth	Test Depth	Elevation (NAVD88)	USCS Group	Moisture Content, w_n	Liquid Limit, w_l	Plastic Limit, w_p	Plasticity Index, I_p	Percent Fines	Organic Content
		(ft)	(ft)	(ft)	(ft)		(%)	(%)	(%)	(%)	(%)	(%)
S0018R	S28	135.0	136.0	135.5	170.3	ML	19.9				61.3	
S0018R	S29A	140.0	141.1	140.6	165.2	SM					42.1	
S0018R	S29B	141.1	141.4	141.3	164.5	ML					85.1	
S0018R	S30	145.0	146.0	145.5	160.3	SM	22.1				49.3	
S0018R	S31	150.0	151.0	150.5	155.3	SM	23.9				17.1	
S0019R	S01	0.0	5.0	2.5	290.03	SM					38.3	
S0019R	S02A	5.0	5.8	5.4	287.13	SM	4.6				39.5	
S0019R	S02B	5.8	6.5	6.2	286.33	ML		23	21	2	64.4	
S0019R	S03A	6.5	7.6	7.1	285.43	SM	4.5				43.3	
S0019R	S04B	9.0	10.0	9.5	283.03	ML	17.9	23	23	3	88.1	
S0019R	S05	9.5	10.8	10.2	282.33	ML	25.6				53.7	
S0019R	S07	12.5	13.8	13.2	279.33	SP-SM					11.9	
S0019R	S08	14.0	15.2	14.6	277.93	SP	24.1				2.8	
S0019R	S09	20.0	21.3	20.7	271.83	SM	12.3				22.3	
S0019R	S10	25.5	26.7	26.1	266.43	SP-SM	20.5				5.0	
S0019R	S12	30.0	31.3	30.7	261.83	SP-SM	23.4				6.3	
S0019R	S12A	35.0	35.7	35.4	257.13	ML					76.9	
S0019R	S12B	35.7	36.4	36.1	256.43	SM					38.6	
S0019R	S13	40.0	40.8	40.4	252.13	ML	23.2				58.5	
S0019R	S14	45.0	46.3	45.7	246.83	SP-SM	15.7				9.3	

Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0001R	S04	8.8	278.6	SP-SM	5.3	107.9	245	196	6.7	34	30
					5.2	107.9	504	373	12.1		
					5.2	107.9	994	703	11.2		
S0002R	S02	5.7	284.7	SM	2.8	115.0	158	120	3.0	38	7
					2.8	115.0	317	269	10.4		
					2.7	115.1	634	495	8.8		
S0003R	S04	8.5	279.5	ML	19.0	125.0	216	575	2.1	41	376
					19.0	125.0	446	749	2.3		
					19.2	124.9	878	1,148	2.2		
S0003R	S10	25.7	262.3	SP-SM	18.0	121.9	778	1,030	2.5	41	364
					17.8	121.9	1,555	1,738	2.9		
					18.3	121.8	3,125	3,080	5.3		
S0003R	S15	50.4	237.6	SP-SM	10.3	130.9	1,656	1,934	3.3	42	448
					10.3	130.9	3,298	3,384	5.1		
					10.3	130.9	6,595	6,343	3.7		
S0004R	S04	8.7	275.0	SM	9.3	118.9	259	334	1.6	43	156
					9.5	118.9	518	729	2.5		
					9.2	118.9	1,037	1,086	2.5		
S0004R	S11	30.7	253.0	SM	16.1	136.2	994	1,312	3.2	42	462
					16.1	136.2	1,987	2,308	5.2		
					16.2	136.2	3,960	3,995	4.8		

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Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0004R	S13	40.5	243.2	ML	14.9	137.0	1,339	2,114	3.3	41	1,043
					14.9	137.0	2,678	3,540	3.7		
					15.0	136.9	5,357	5,682	4.5		
S0005R	S02	5.8	279.5	SP-SM	5.3	111.9	158	206	4.5	37	79
					5.0	111.9	317	297	12.8		
					5.0	111.9	634	553	16.0		
S0005R	S08	14.3	271.0	ML	13.1	97.9	418	320	4.9	32	30
					13.5	98.0	835	501	11.1		
					13.3	97.9	1,685	1,089	10.7		
S0005R	S10	25.4	259.9	ML	18.5	119.0	749	870	3.3	41	223
					18.8	118.9	1,498	1,552	4.9		
					18.5	119.0	2,995	9,150	7.1		
S0005R	S15	47.0	238.3	ML	19.3	129.9	1,526	1,630	3.3	39	324
					19.5	130.0	3,038	2,696	5.8		
					19.3	129.9	6,077	5,293	7.4		
S0006R	S14	38.7	248.9	SM	11.9	137.0	1,210	2,200	4.0	37	1,525
					12.1	137.0	2,419	3,696	4.0		
					12.1	137.0	4,838	5,046	10.4		
S0007R	S04	5.7	279.4	SM	13.2	136.9	173	347	2.5	41	187
					13.3	136.9	346	465	2.9		
					13.0	137.0	677	773	2.5		

Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0010R	S02	5.8	280.3	SM	3.9	120.9	173	223	2.9	36	88
					4.0	121.0	346	328	11.5		
					3.6	120.9	677	590	7.4		
S0010R	S09	20.7	265.4	SM	17.0	133.1	662	652	6.4	35	156
					17.0	133.1	1,325	1,027	6.8		
					16.8	133.0	2,635	2,010	5.6		
S0010R	S12	35.7	250.4	SM	19.3	120.1	1,123	1,192	8.0	39	291
					19.3	120.0	2,246	2,134	3.2		
					19.1	120.1	4,478	3,924	8.0		
S0012R	S02	5.8	281.8	SM	11.1	137.0	173	395	1.0	41	235
					11.5	136.9	346	528	1.2		
					11.0	137.0	677	835	1.6		
S0012R	S07	13.2	274.4	SM	18.6	131.1	446	693	6.4	43	312
					18.6	131.1	878	1,175	4.8		
					18.4	131.1	1,757	1,175	4.4		
S0014R	S02	5.8	278.8	SM	8.2	102.9	158	150	1.6	37	24
					8.1	102.9	317	249	4.5		
					8.0	102.9	634	500	10.5		
S0014R	S11	11.6	273.0	CL-ML	13.8	136.9	331	592	4.1	43	269
					13.9	137.0	662	865	2.9		
					13.7	136.9	1,325	1,509	3.3		

Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0015R	S02	5.8	280.9	SM	16.2	104.0	158	96	4.1	31	27
					16.1	103.9	317	261	2.9		
					16.4	103.9	634	397	5.8		
S0015R	S09A	20.2	266.5	SM	17.5	133.8	648	655	3.3	41	121
					17.6	133.9	1,296	1,279	4.5		
					17.6	133.9	2,606	648	5.3		
S0016R	S02	5.5	283.3	ML	12.4	119.9	158	279	1.6	37	128
					12.4	119.9	317	317	2.9		
					12.6	119.9	634	618	8.2		
S0016R	S08	35.5	253.3	SP-SM	16.9	125.0	1,224	1,338	4.3	42	360
					16.7	124.5	2,462	2,763	5.1		
					16.7	124.5	4,925	4,732	4.9		
S0016R	S13	60.8	228.0	SM	14.4	122.9	2,117	1,649	9.6	32	312
					14.5	123.0	4,234	2,981	8.8		
					14.5	123.0	8,482	5,662	7.4		
S0016R	S20	95.8	193.0	SM	15.3	137.0	3,384	3,027	4.5	39	298
					15.1	136.9	6,782	5,772	7.8		
					15.0	136.9	13,565	11,244	8.2		
S0016R	S23A	110.4	268.5	SP-SM	13.3	136.9	3,946	3,738	6.7	37	845
					13.2	136.9	7,877	6,862	7.5		
					13.1	137.0	15,768	12,650	6.6		

CALIFORNIA High-Speed Rail Authority

U.S. Department of Transportation Federal Railroad Administration

Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0016R	S25	120.8	168.0	CL	15.0	136.9	4,334	3,378	4.5	40	361
					14.8	137.0	8,654	8,569	6.2		
					14.7	137.0	17,323	14,606	7.4		
S0016R	S31	150.8	138.0	SM	31.6	94.0	5,400	4,195	10.7	26	1,637
					31.6	94.0	10,800	6,915	8.2		
					31.6	94.0	21,600	12,028	9.9		
S0017R	S02	5.8	284.7	ML	8.6	125.0	173	207	3.3	36	75
					8.7	124.9	346	323	4.5		
					8.7	124.9	677	577	6.6		
S0017R	S07	30.7	259.8	SM	19.0	130.9	1,066	1,359	4.2	43	344
					18.9	131.0	2,117	2,232	3.8		
					19.0	130.9	4,234	4,248	5.3		
S0017R	S10	45.5	245.0	SM	10.8	132.0	1,570	1,413	4.1	34	353
					10.9	131.9	3,139	2,393	4.5		
					10.8	131.9	6,278	4,514	6.6		
S0017R	S13	60.6	229.9	SM	11.3	121.9	2,117	1,786	6.2	37	84
					11.5	121.9	4,219	3,180	9.9		
					11.1	121.9	8,438	1,426	7.8		
S0017R	S18A	85.3	205.2	SM	11.7	136.9	2,995	2,804	4.1	39	348
					11.7	136.9	6,005	5,253	6.2		
					11.9	137.0	11,995	10,164	6.2		

Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0017R	S21	100.5	190.0	SC	14.0	136.9	3,571	2,962	4.1	37	432
					14.0	136.9	7,142	5,905	7.0		
					14.2	136.9	14,285	10,964	6.2		
S0017R	S24	115.7	174.8	SM	13.5	137.0	4,147	3,322	7.8	38	308
					13.2	136.9	8,280	7,176	6.7		
					13.3	136.9	16,560	13,193	8.2		
S0017R	S30	145.5	145.0	ML	14.3	136.9	5,227	4,324	4.9	32	955
					14.2	136.9	10,440	7,291	7.0		
					14.2	136.9	20,880	14,016	7.0		
S0018R	S02	5.8	300.0	CL-ML	10.1	124.9	173	202	2.1	31	109
					10.3	125.0	346	336	1.6		
					10.1	124.9	677	513	4.1		
S0018R	S04	15.7	290.1	SM	11.7	136.9	533	612	3.7	38	216
					12.1	136.9	1,066	1,087	4.1		
					11.8	137.0	2,117	1,868	3.7		
S0018R	S06	25.6	280.2	CL-ML	20.2	129.0	893	937	4.7	41	117
					20.0	128.9	1,786	1,614	5.3		
					19.8	128.9	3,557	3,244	6.2		
S0018R	S09	40.6	265.2	SP-SM	19.6	130.0	1,397	1,590	3.3	37	533
					19.5	130.0	2,794	2,677	5.8		
					19.8	129.9	5,602	4,800	6.3		

Table E-3
Summary of Remolded Direct Shear Test Results

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0018R	S14	65.4	240.4	SP-SM	13.0	137.0	2,275	2,527	2.5	35	1,080
					12.9	136.8	4,536	4,487	4.1		
					12.6	136.9	9,086	7,384	7.0		
S0018R	S18A	85.7	220.1	ML	15.4	135.9	3,024	2,795	4.1	41	223
					15.5	135.9	6,034	5,524	6.6		
					15.6	135.9	12,082	10,666	6.3		
S0018R	S27	130.5	175.3	SM	17.1	132.9	4,680	3,832	6.6	33	1,080
					17.0	132.9	9,360	7,425	7.8		
					17.2	132.9	18,720	12,925	4.5		
S0018R	S30	145.5	160.3	SM	14.9	137.0	5,227	4,082	6.2	32	837
					14.6	136.8	10,440	7,396	6.6		
					14.8	137.0	20,880	14,016	5.3		
S0019R	S02A	5.4	287.1	SM	11.0	104.9	144	111	2.6	24	40
					11.0	104.9	302	166	5.3		
					10.9	104.9	605	311	7.4		
S0019R	S04B	9.5	283.0	ML	16.8	114.9	245	282	2.9	36	58
					16.7	114.9	504	360	5.4		
					16.9	114.9	994	812	3.8		
S0019R	S08	14.6	277.9	SP	23.4	117.0	403	406	3.0	42	45
					23.7	116.9	806	770	4.5		
					23.8	117.0	1,598	648	4.1		

Table E-4
Summary of Modified Proctor Test Results

Borehole ID	Sample No.	Depth (ft)	USGS Group	Elevation (NAVD88) (ft)	Max. Dry Unit Weight (pcf)	Optimum Moisture Content (%)
S0001R	S01	0 - 5.0	SM	284.9	136.6	6.4
S0003R	S01	0 - 5.0	SM	285.5	136.7	6.4
S0004R	S01	0 - 5.0	ML	281.2	121.0	12.2
S0005R	S01	0 - 5.0	SP-SM	282.8	133.9	6.0
S0013AR	S01	0 - 5.0	SM	283.6	125.5	9.8
S0015R	S01	0 - 5.0	SM	284.2	130.3	8.2
S0017R	S01	0 - 5.0	SM	288.0	125.4	7.6
S0018R	S01	0 - 5.0	SM	303.3	127.4	8.6
S0019R	S01	0 - 5.0	SM	290.0	123.4	7.8

Table E-5
Summary of California Bearing Ratio Tests

Borehole ID	Sample No.	Depth (ft)	USGS Group	Elevation (NAVD88) (ft)	California Bearing Ratio
S0001R	S01	0 - 5.0	SM	284.9	47
S0003R	S01	0 - 5.0	SM	285.5	40
S0004R	S01	0 - 5.0	ML	281.2	20
S0005R	S01	0 - 5.0	SP-SM	282.8	50
S0013AR	S01	0 - 5.0	SM	283.6	13
S0015R	S01	0 - 5.0	SM	284.2	35
S0017R	S01	0 - 5.0	SM	288.0	28
S0018R	S01	0 - 5.0	SM	303.3	23
S0019R	S01	0 - 5.0	SM	290.0	13

Table E-6
Summary of Groundwater Chemistry Test Results

Test	Test Reference	Borehole ID		
		S0016R	S0017R	S0018R
pH	SM 4500-H$^+$B	7.51	7.24	7.51
Calcium (mg/L)	EPA 200.7	88	78	47
Bicarbonate Alkalinity as $CaCO_3$ (mg/L)	SM 2320B	280	260	220
Specific Conductance (umhos/cm)	SM 2510B	1100	860	570
Total Dissolved Solids (mg/L)	SM 2320B	740	580	380
Chloride (mg/L)	EPA 300.0	83	49	23
Sulfate as SO_4 (mg/L)	EPA 300.0	53	110	21

MOISTURE CONTENT

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0002R, S02	5-6.3			3.9
S0002R, S05A	9.5-10.3			15.1
S0002R, S09	20-21.3			14.8

Test Method: ASTM D2216, ASTM D2937

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MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0002R, S12	35-36.4	2.2	
S0002R, S13	40-41.3	2.1	16.5
S0002R, S14	45-46.4	2.4	27.9
S0002R, S19	70-71.5	3.3	30.5

Test Method: ASTM D2974

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0006R, S08	14-15.2			21.9
S0006R, S10	25-26.2			22.8
S0006R, S13	36.5-38			25.8
S0006R, S17	50-51.2			14.2

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0007R, S04	5-6.3			10.3
S0007R, S06	9-10.3			13.6
S0007R, S07	12.5-14.0			19.9

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0007R, S03	6.5-8			11.1
S0007R, S08	14-15.3			14.1
S0007R, S11A	30-30.5			29.7
S0007R, S11B	30.5-31			14.1
S0007R, 13B	40.8-41.4			17.8
S0007R, S14	45-46.3			28.6
S0007R, S17	60-61.5			17.5
S0007R, S18	65-66.5			17.9
S0007R, S20	75-76.2			22.4
S0007R, S21	80-81.1			29.3

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0010R, S02	5-6.5			4.8
S0010R, S04	8-9.4			15.9
S0010R, S09	20-21.3			16.9
S0010R, S11	30-31.2			20.9
S0010R, S12	35-36.4			17.4

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0010R, S06	11-12.4			16.4
S0010R, S10	25-26.5			30.8
S0010R, S14	45-46.3			15.2
S0010R, S16	55-56.5			31.7
S0010R, S17	60-61.3			23.0
S0010R, S21	80-81.5			28.4
S0010R, S25	100-101.3			18.9
S0010R, S30	125-126.2			36.9
S0010R, S35	150-151.5			36.8

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0012R, S02	5-6.5			6.1
S0012R, S07	12.5-13.8			15.5
S0012R, S09A	20-21.0			33.2
S0012R, S14	45-46.4			14.8

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0013AR, S03	6.5-7.2			10.1
S0013AR, S05	9.5-10.5			23.8
S0013AR, S07	12.5-13.5			18.5
S0013AR, S10	25-26.2			24.5
S0013AR, S14	45-45.9			15.0
S0013AR, S17	60-61.2			24.3
S0013AR, S21	80-80.9			23.0
S0013AR, S26	105-105.9			17.4
S0013AR, S28	115-115.9			26.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-111** | November 1, 2011

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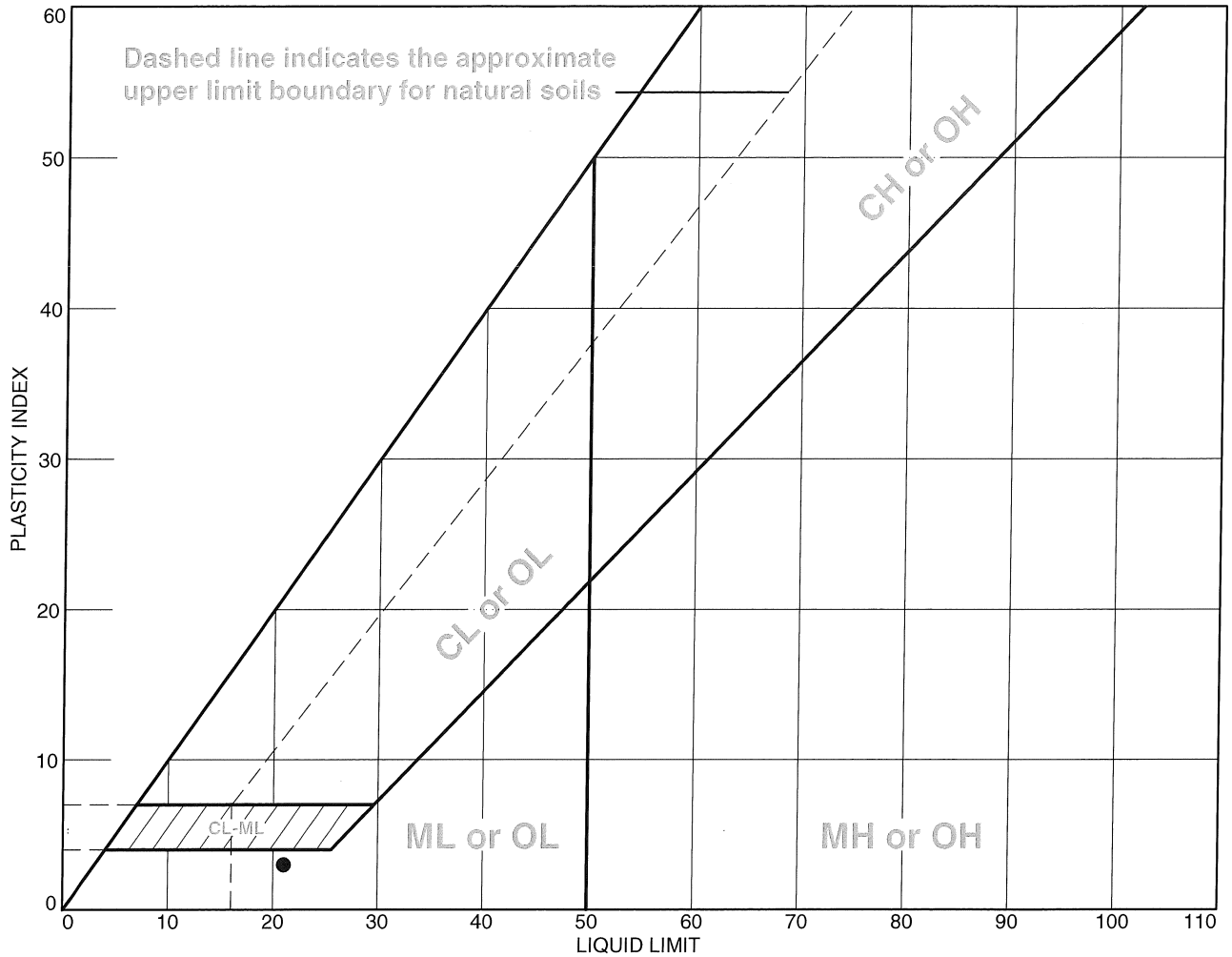GEOTECHNICAL AND MATERIALS TESTING SERVICES

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0013AR, S04	8-8.8			12.0
S0013AR, S06A	11-11.7			16.3
S0013AR, S08	14-15.0			16.2
S0013AR, S11	30-31.5			21.7
S0013AR, S13	40-41.5			26.6

Test Method: ASTM D2216, ASTM D2937

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0014AR, S02	5-6.5			17.4
S0014AR, S04	8-9.2			16.0
S0014AR, S05	9.5-11.0			21.3
S0014AR, S06	11-12.2			14.9
S0014AR, S07	12.5-13.8			21.4
S0014AR, S12	35-36.5			12.0
S0014AR, S13	40-41.4			16.9
S0014AR, S14	46.5-45.8			16.4
S0014AR, S15	50-51.4			19.3
S0014AR, S17	60-61.5			24.2

Test Method: ASTM D2216, ASTM D2937

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Phone: (916) 939-3460 FAX: (916) 939-3507

CA High Speed Train, Fresno to Bakersfield

SA-HST019

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0014AR, S19	70-71.4			14.9
S0014AR, S20	75-76.5			22.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 1, 2011		

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SA-HST019

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0014AR, S03	6.5-7.8			14.9
S0014AR, S09	20-21.3			8.2
S0014AR, S11	30-31.2			12.3

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 16, 2011		

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0014R, S02	5-6.5			7.5
S0014R, S03	6.5-7.8			11.1
S0014R, S11	11-12.3			19.3
S0014R, S13	40-41.4			22.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 16, 2011	

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0014R, S04	8-9.3			19.9
S0014R, S05	9.5-10.7			16.5
S0014R, S07	12.5-13.9			20.1
S0014R, S10	25-26.4			12.6
S0014R, S15	50-51.5			33.5
S0014R, S16	55-56.4			29.4

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-111** | November 1, 2011

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0015R, S04	8-9.5			19.7
S0015R, S06B	11.4-12.5			19.9
S0015R, S08	14-15.5			21.7
S0015R, S12B	35.6-36.4			17.5
S0015R, S13	40-41.2			17.5

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 1, 2011	

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CA High Speed Train, Fresno to Bakersfield

SA-HST019

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0015R, S02	5-6.5			7.0
S0015R, S08A	6.5-7.0			14.3
S0015R, S09A	20-20.3			15.6
S0015R, S10	25-26.5			22.1
S0015R, S11A	30-30.7			21.2

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 16, 2011	CA High Speed Train, Fresno to Bakersfield
			SA-HST019

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0018R, S03	10-11.2			14.4
S0018R, S05	20-21			13.1
S0018R, S10	45-45.8			12.4
S0018R, S13	60-60.8			15.1
S0018R, S15	70-71.2			12.9
S0018R, S17	80-81.2			16.7
S0018R, S19A	90-90.4			30.2
S0018R, S19B	90.4-91.2			27.1
S0018R, S21	100-100.9			16.9
S0018R, S23	110-111.2			17.0

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 1, 2011	

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CA High Speed Train, Fresno to Bakersfield

SA-HST019

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0018R, S28	135-136			19.9
S0018R, S31	150-151			23.9

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: 11-111	November 1, 2011	CA High Speed Train, Fresno to Bakersfield
		SA-HST019

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0018R, S02	5-6.5			10.1
S0018R, S04	15-16.3			11.8
S0018R, S06	25-26.2			24.9
S0018R, S09	40-41.1			18.1
S0018R, S14	65-65.7			12.4
S0018R, S16	75-75.6			13.5
S0018R, S18	85-86.4			20.4
S0018R, S20	95-96			13.5
S0018R, S27	130-130.9			21.5
S0018R, S30	145-146			22.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 16, 2011	CA High Speed Train, Fresno to Bakersfield
			SA-HST019

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0019R, S05	9.5-10.8			25.6
S0019R, S09	20-21.3			12.3
S0019R, S13	40-40.8			23.2

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 1, 2011	CA High Speed Train, Fresno to Bakersfield	
			SA-HST019	

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
S0019R, S02A	5-5.8			4.6
S0019R, S03A	6.5-7.6			4.5
S0019R, S04B	9-10.0			17.9
S0019R, S08	14-15.2			24.1
S0019R, S10	25.5-26.7			20.5
S0019R, S12	30-31.3			23.4
S0019R, S14	45-46.3			15.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-111	November 16, 2011	CA High Speed Train, Fresno to Bakersfield

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ORGANIC CONTENT

MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0001R, S09	20-21.5	1.4	
S0001R, S10	25-26.5	2.4	13.1
S0001R, S14	45-46.5	2.9	31.9
S0001R, S15	50-51.5	1.2	22.8

Test Method: ASTM D2974

PROJECT NUMBER: 11-111 | November 16, 2011

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CA High Speed Train, Fresno to Bakersfield

SA-HST019

MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0002R, S12	35-36.4	2.2	
S0002R, S13	40-41.3	2.1	16.5
S0002R, S14	45-46.4	2.4	27.9
S0002R, S19	70-71.5	3.3	30.5

Test Method: ASTM D2974

PROJECT NUMBER:	11-111	November 16, 2011	CA High Speed Train, Fresno to Bakersfield

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SA-HST019

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MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0003R, S05	9.5-11	3.0	18.5
S0003R, S06	11-12.5	1.9	24.7
S0003R, S09	20-21.5	1.3	
S0003R, S12	35-36.5	2.3	23.8
S0003R, S13	40-41.5	2.3	15.5
S0003R, S16B	55.4-56.5	1.9	
S0003R, S17	60-61.5	3.4	18.6
S0003R, S20	75-76.5	1.8	29.5

Test Method: ASTM D2974

PROJECT NUMBER: **11-111** November 16, 2011

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CA High Speed Train, Fresno to Bakersfield

SA-HST019

MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0004R, S03	6.5-7.9	3.1	25.2
S0004R, S05A	9.5-10.5	2.6	
S0004R, S06B	11.6-12.5	1.7	10.3
S0004R, S07	12.5-13.1	2.0	
S0004R, S08	14-15.5	1.4	16.1
S0004R, S14	45-45.9	2.3	20.2
S0004R, S20B	65.2-66.3	2.1	24.6
S0004R, S21	70-70.9	2.3	30.5

Test Method: ASTM D2974

PROJECT NUMBER: **11-111** November 16, 2011

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MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0005R, S05	9.5-11	1.9	21.1
S0005R, S06	11-12.5	1.5	21.8
S0005R, S07	12.5-14	2.1	18.4
S0005R, S11B	30.6-31.5	2.7	17.0
S0005R, S13	40-41.5	5.1	24.3
S0005R, S14	45-46.5	3.5	33.1
S0005R, S17	49.5-51	1.8	19.8

Test Method: ASTM D2974

PROJECT NUMBER: **11-111** November 16, 2011

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MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0010R, S05	9.5-10.9	3.2	
S0010R, S07	12.5-13.2	1.5	
S0010R, S14	45-46.3	3.1	15.7
S0010R, S15	50-51.3	1.5	
S0010R, S17	60-61.3	1.9	
S0010R, S18	65-66.4	5.8	21.7
S0010R, S21	80-81.5	1.8	
S0010R, S22	85-86.4	1.6	31.3

Test Method: ASTM D2974

PROJECT NUMBER: **11-111** November 16, 2011

CA High Speed Train, Fresno to Bakersfield

SA-HST019

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MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0014AR, S04	8-9.2	1.9	16.0
S0014AR, S07	12.5-13.8	3.4	21.0

Test Method: ASTM D2974

PROJECT NUMBER:	11-111	November 1, 2011	

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SA-HST019

MOISTURE AND ORGANIC CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Organic Content, %	Moisture Content, %
S0018R, S21	100-100.9	2.1	16.9

Test Method: ASTM D2974

PROJECT NUMBER:	11-111	November 1, 2011		
			CA High Speed Train, Fresno to Bakersfield	
			SA-HST019	

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ATTERBERG LIMITS

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	21	18	3		63.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0001R, S09   **Depth:** 20-21.5   **Sample Number:** S35500
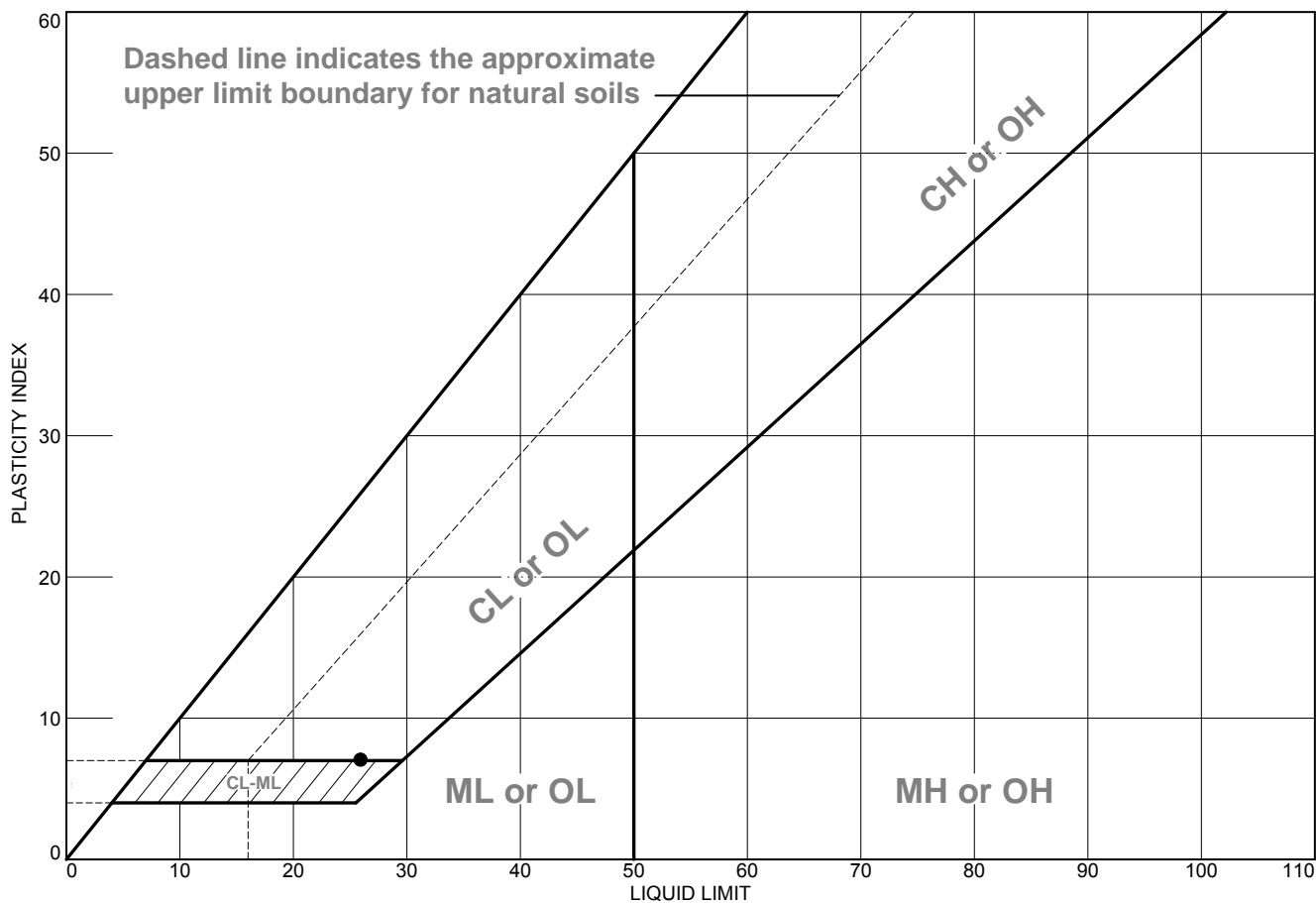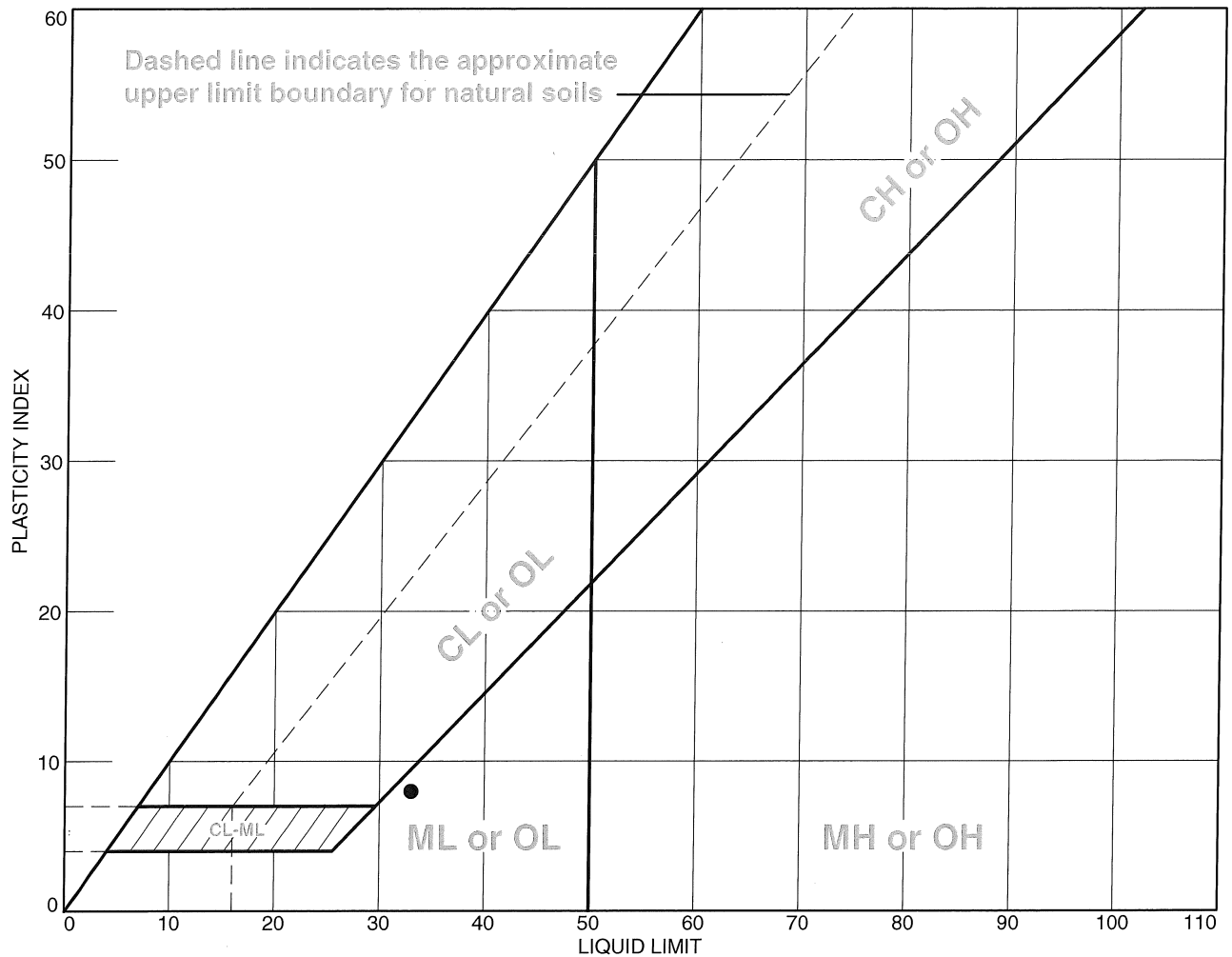
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
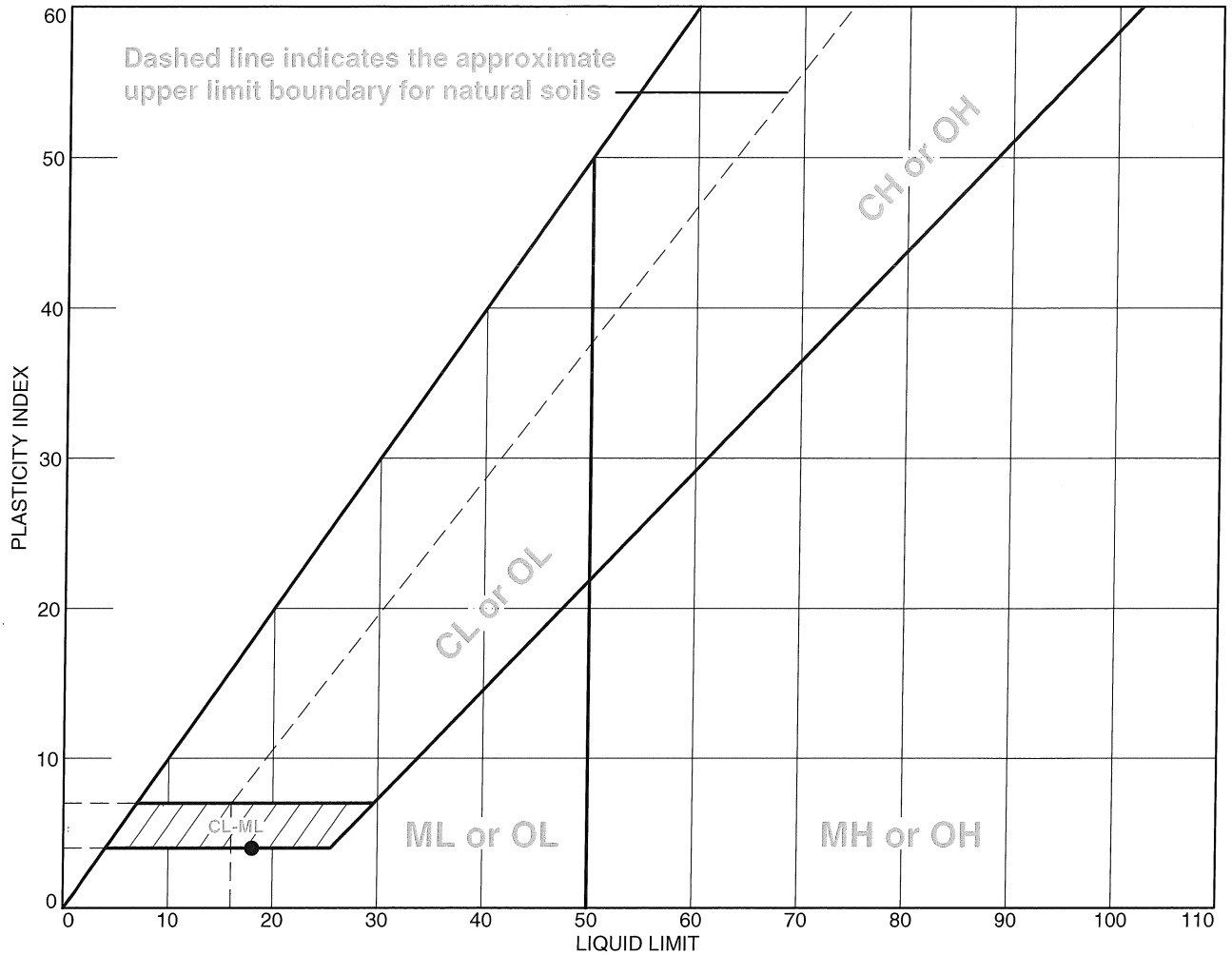
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	18	14	4		50.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0001R, S10   **Depth:** 25-26.5   **Sample Number:** S35501
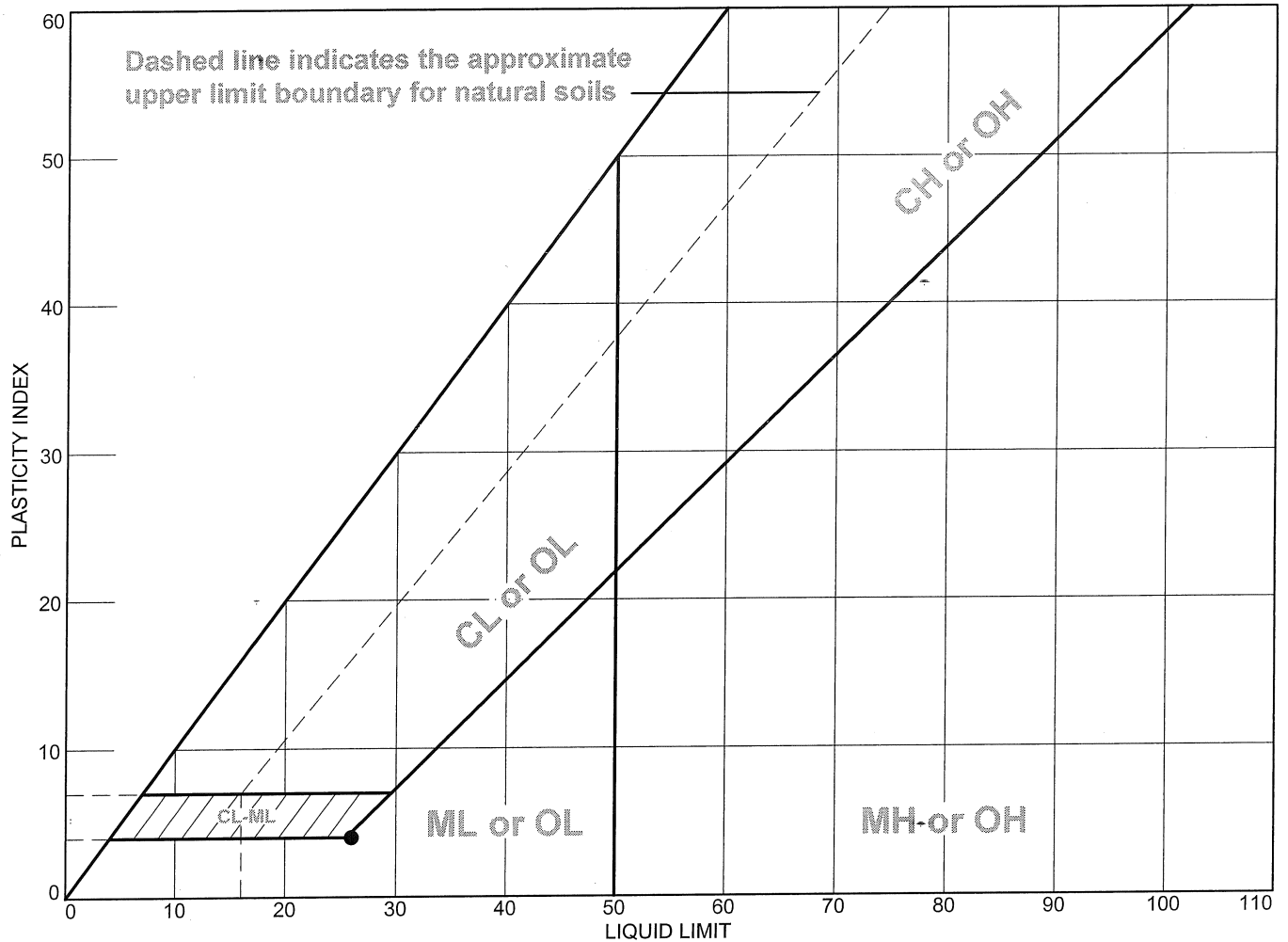
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr_   Checked By: _cw_

LIQUID AND PLASTIC LIMITS TEST REPORT

Chart: PLASTICITY INDEX (y-axis, 0 to 60) vs LIQUID LIMIT (x-axis, 0 to 110)

Dashed line indicates the approximate upper limit boundary for natural soils

Zones labeled: CH or OH, CL or OL, ML or OL, MH or OH, CL-ML
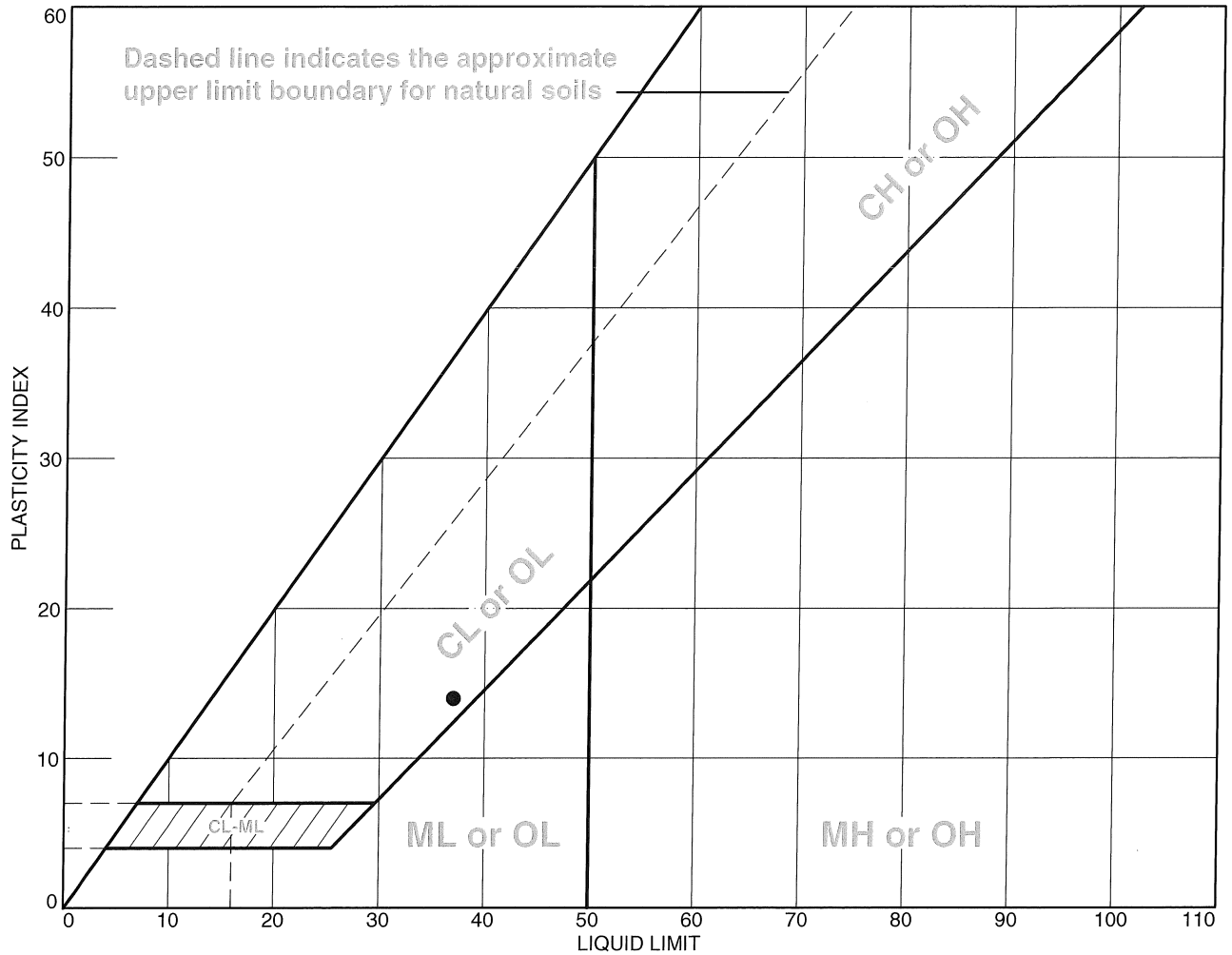
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	37	23	14	99.3	97.2	CL

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0001R, S14 **Depth:** 45-46.5 **Sample Number:** S35502

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CL or OL

CH or OH

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT
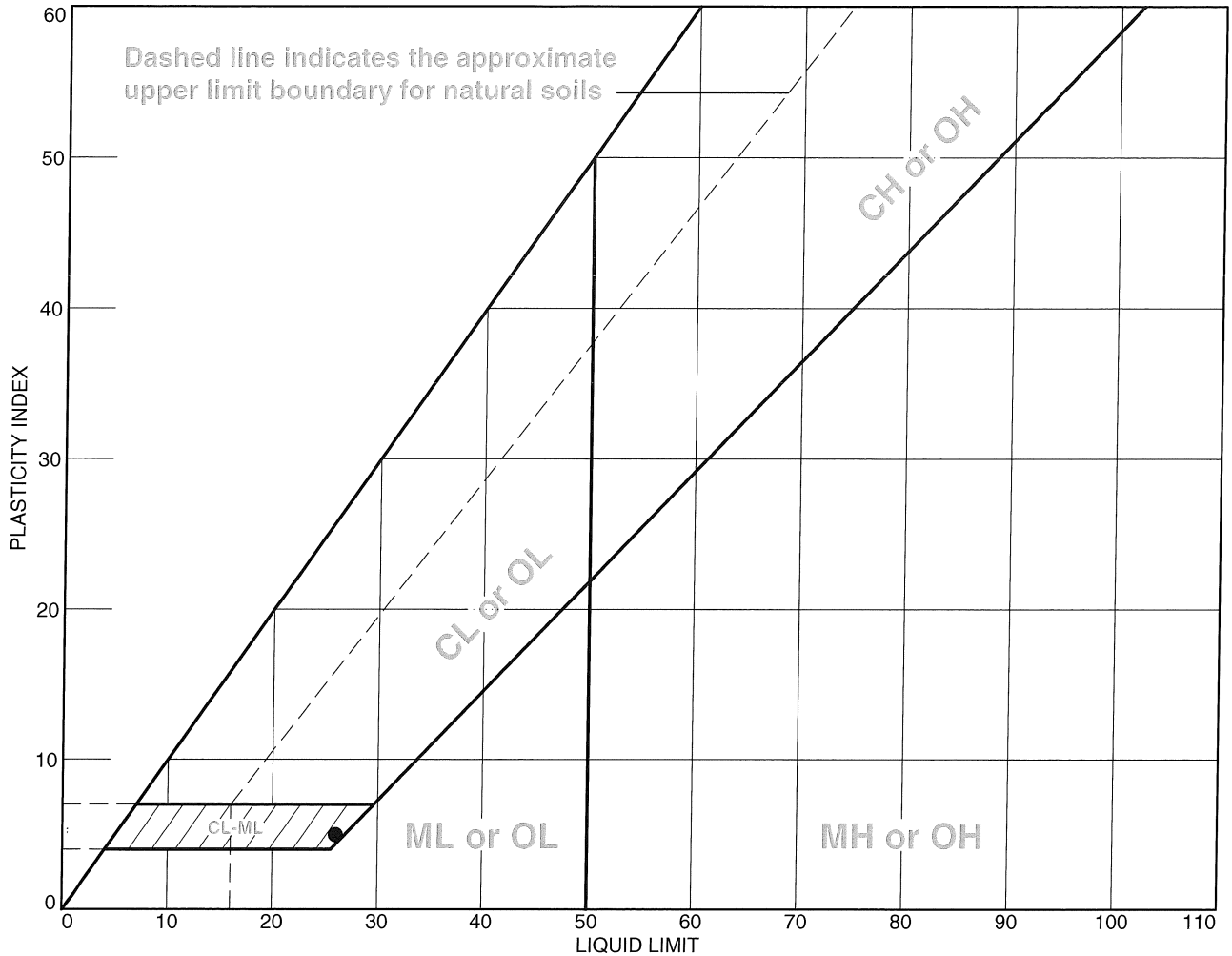
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	26	21	5		90.2	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0001R, S15   **Depth:** 50-51.5   **Sample Number:** S35503
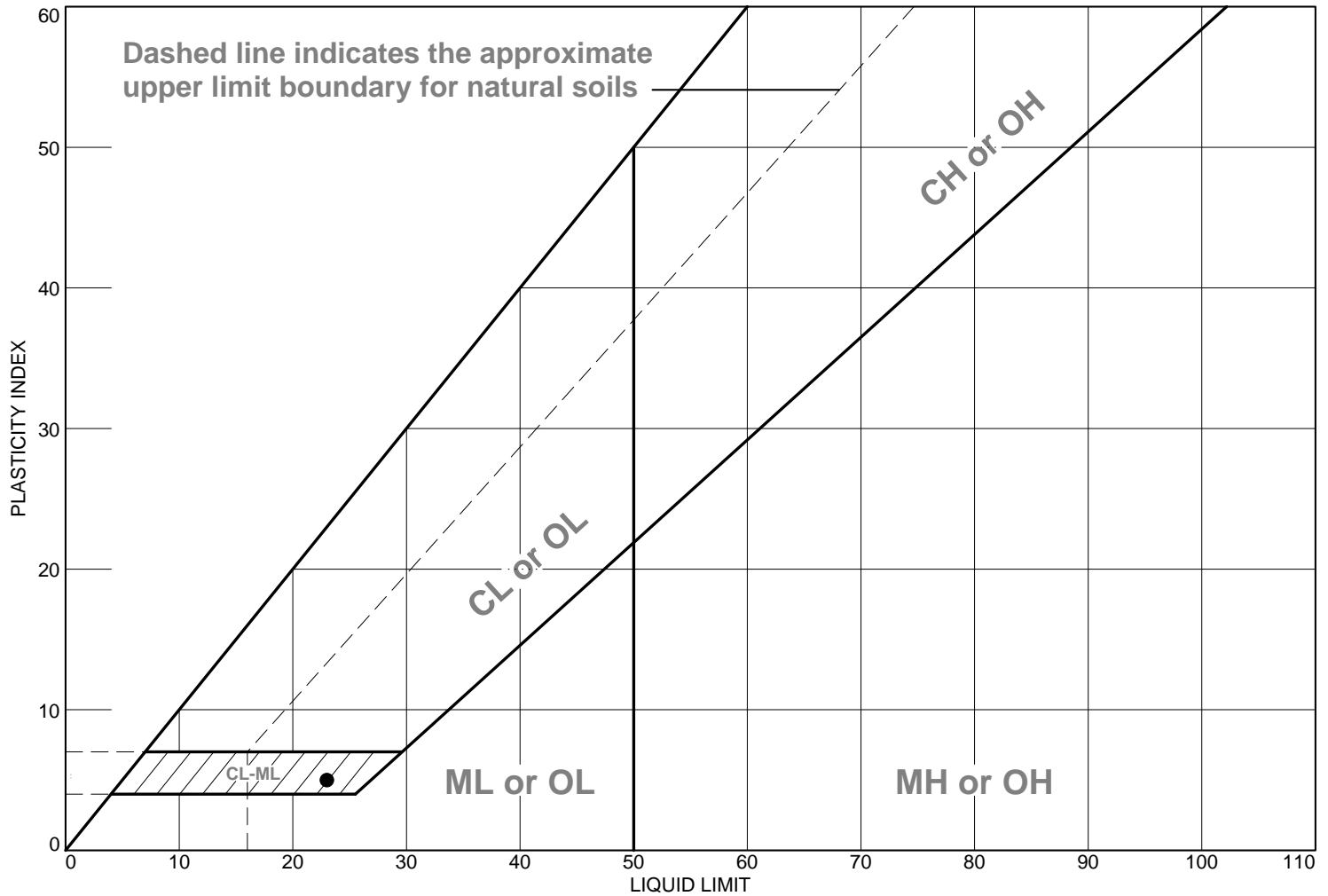
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
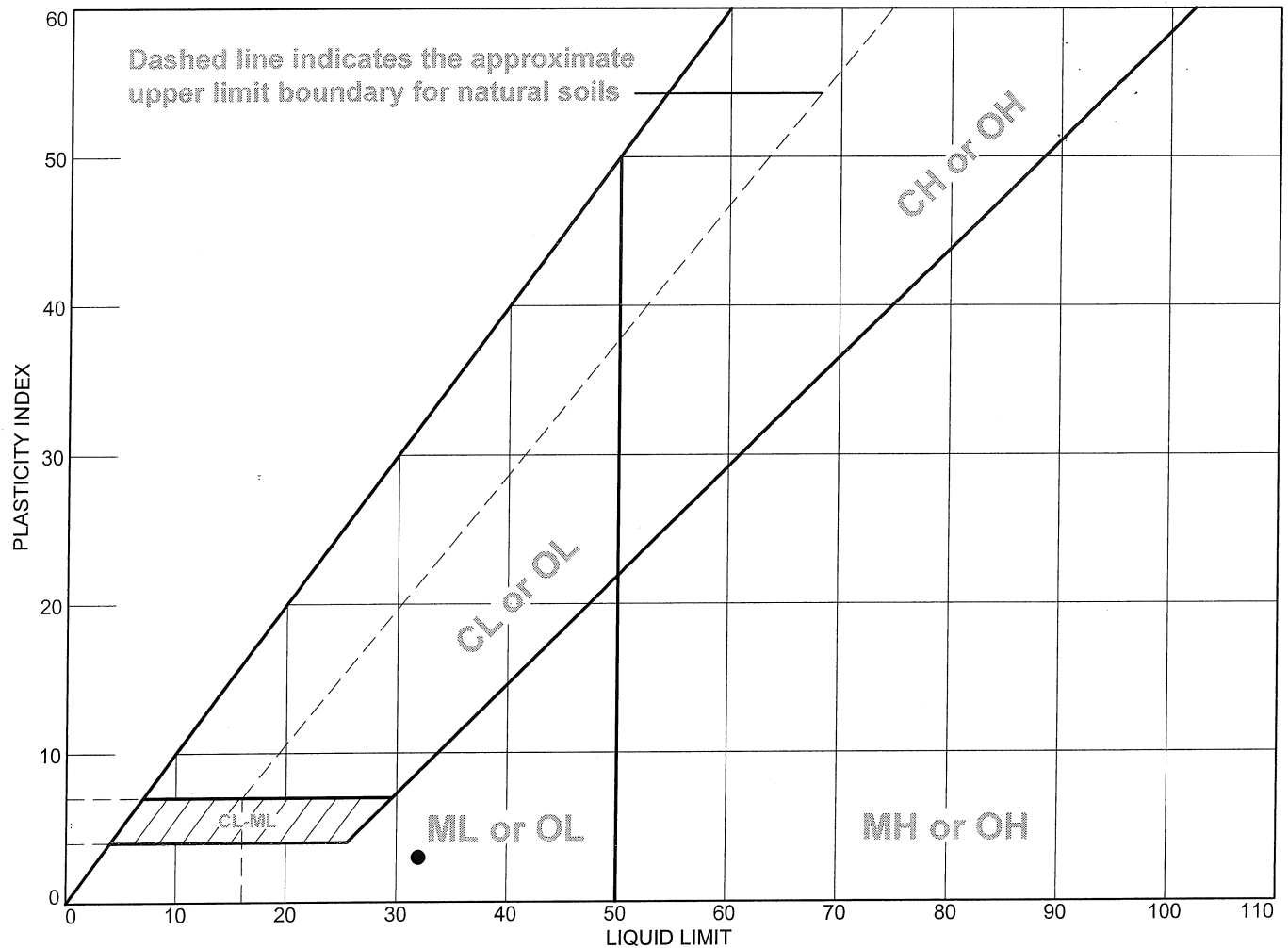
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	32	29	3		86.4	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0002R, S12   **Depth:** 35-36.4   **Sample Number:** S35508
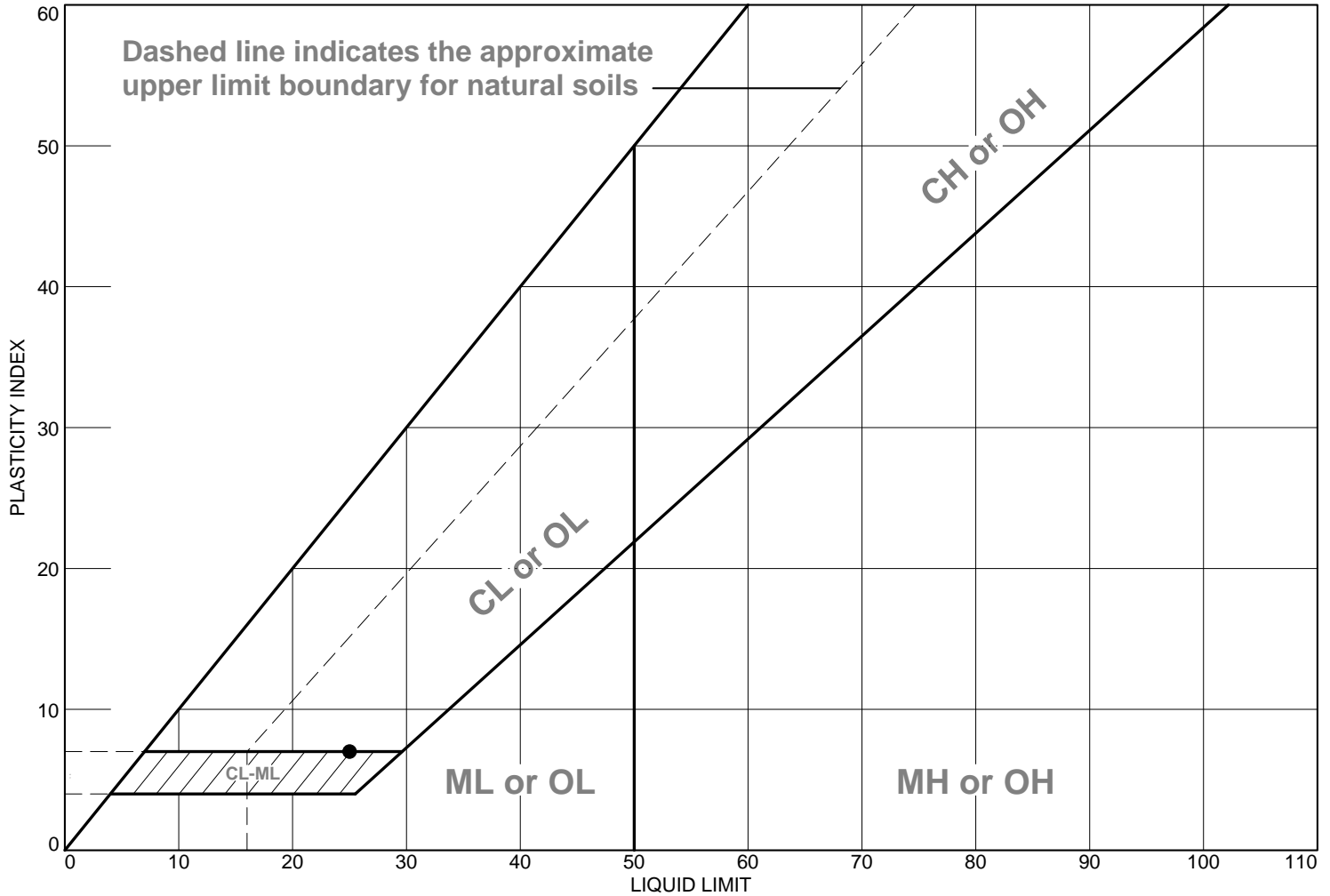
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw
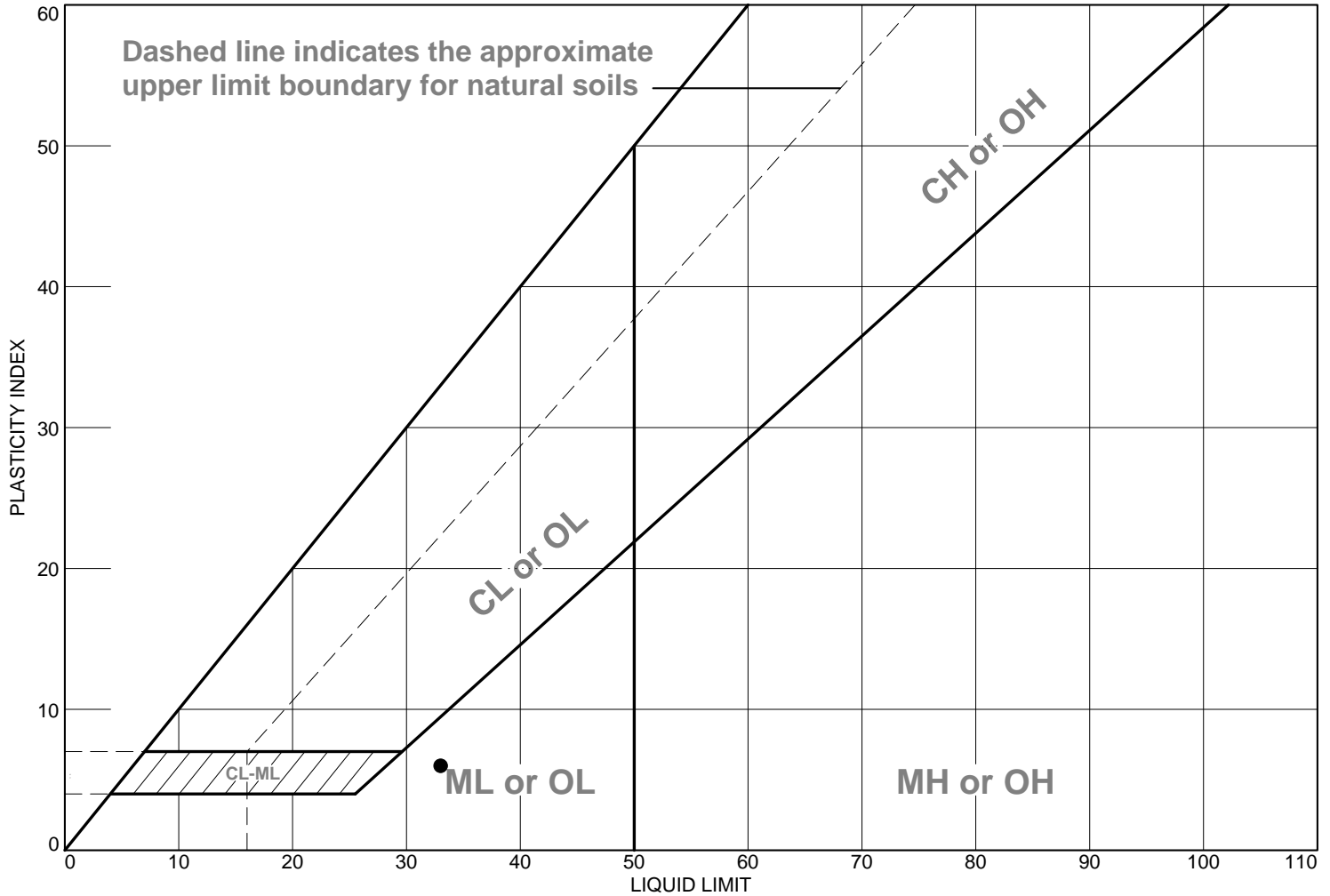
LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils
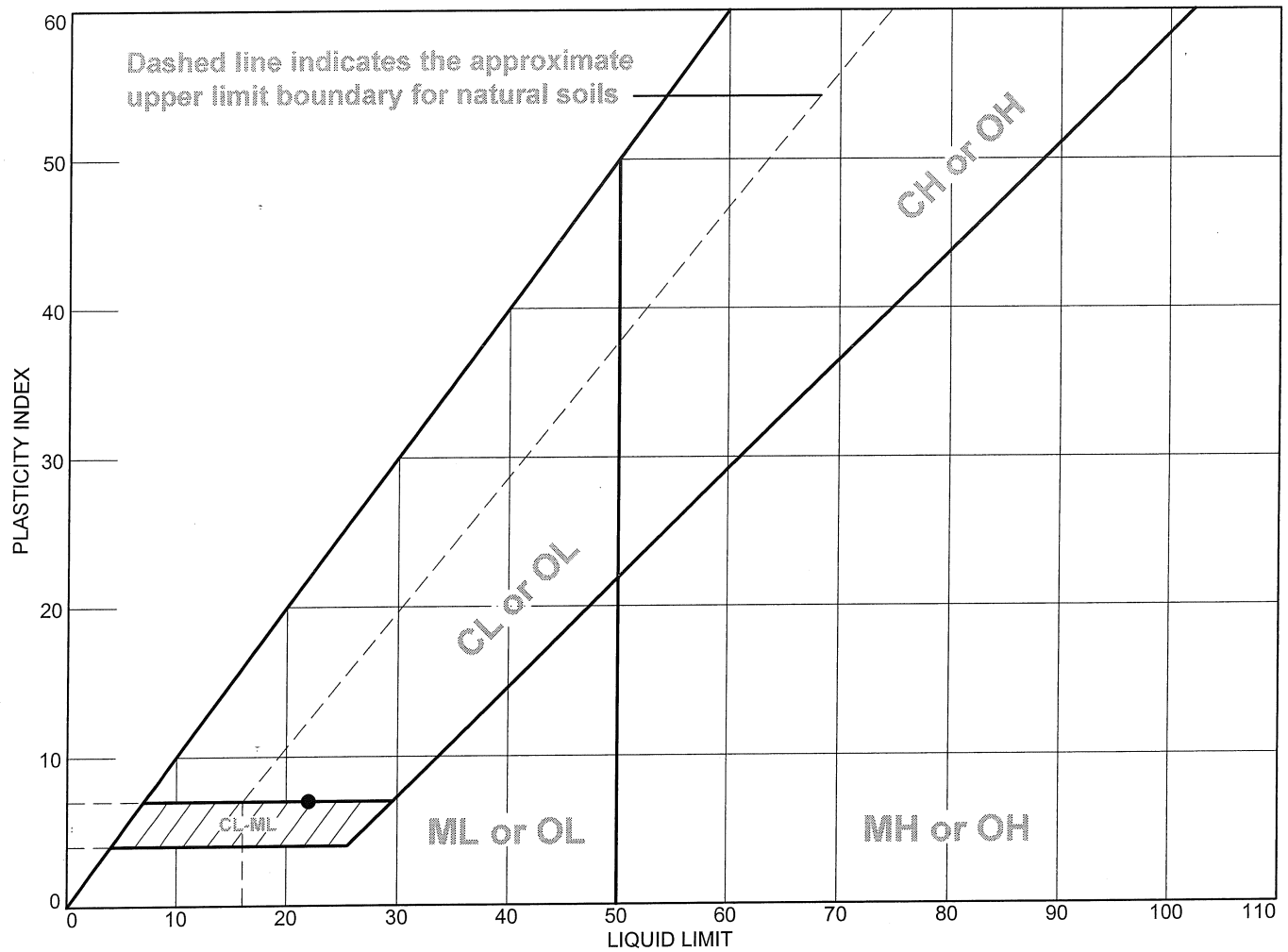
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	22	15	7		52.0	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0002R, S13 **Depth:** 40-41.3 **Sample Number:** S35509

Remarks:

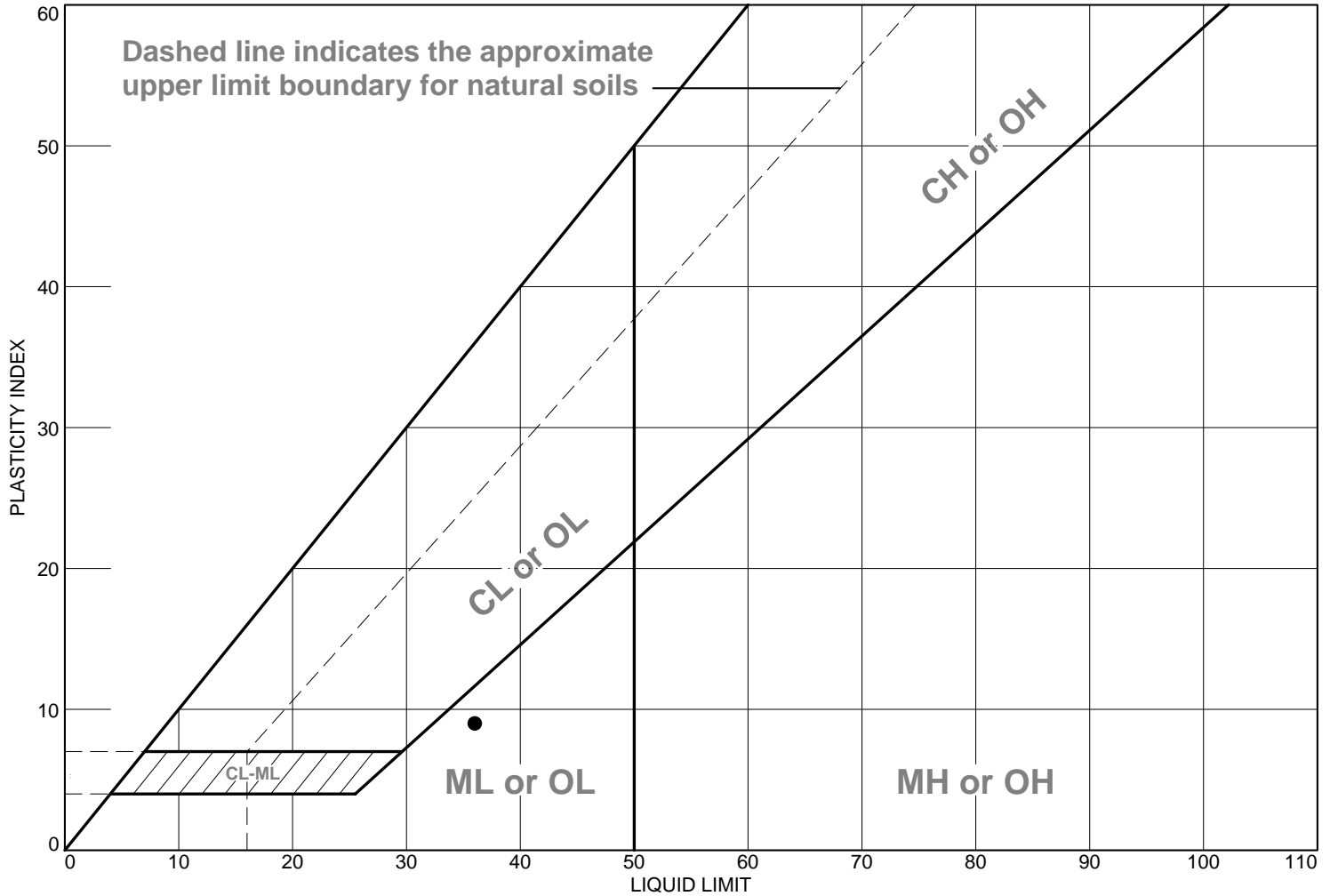**SIERRA TESTING LABS, INC.**

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
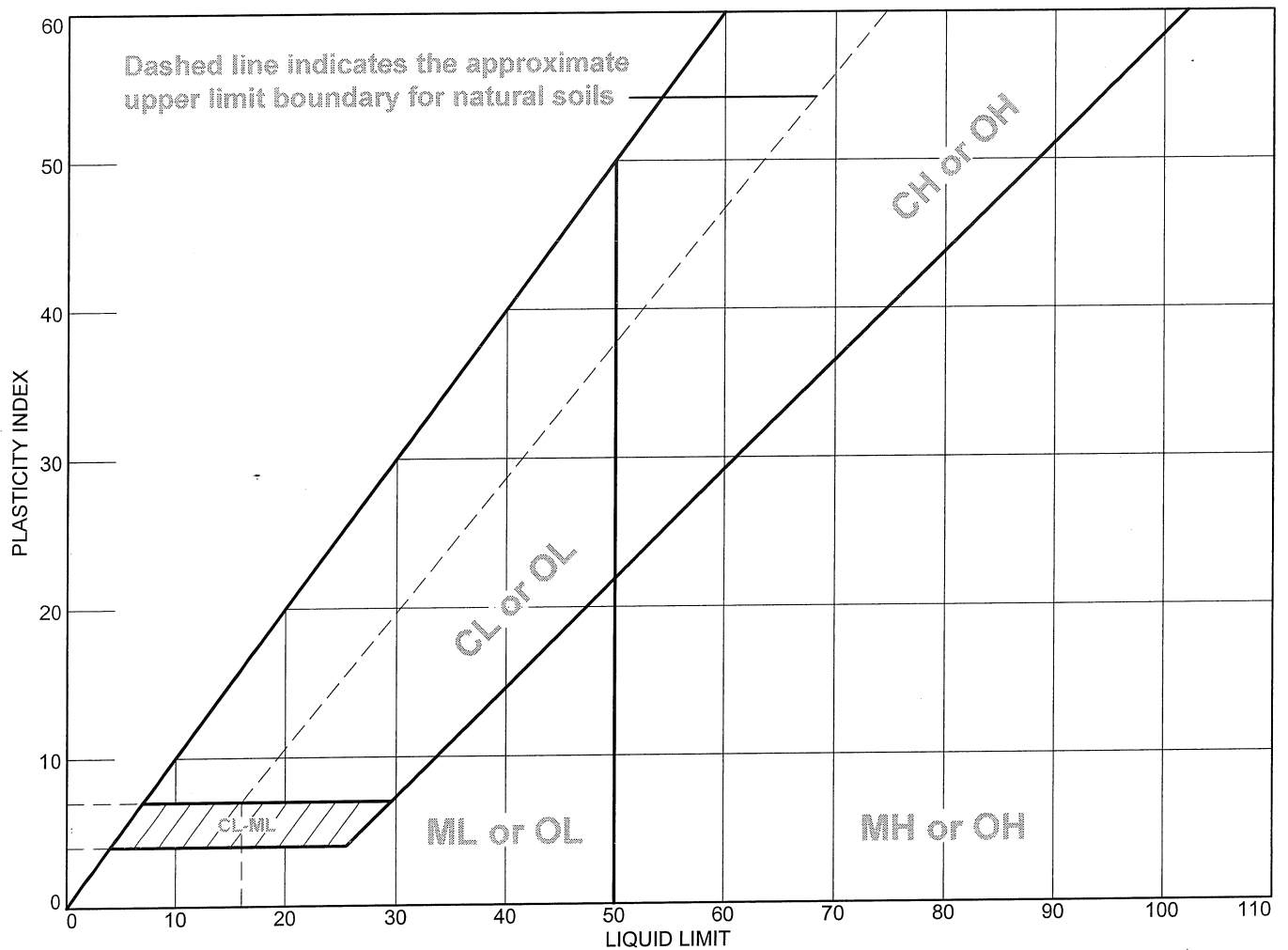
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	24	24	NP		81.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0002R, S14   **Depth:** 45-46.4   **Sample Number:** S35510

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

Plasticity chart with zones CH or OH, CL or OL, ML or OL, MH or OH, CL-ML. X-axis: LIQUID LIMIT (0–110), Y-axis: PLASTICITY INDEX (0–60). Data point plotted at approximately LL=31, PI=7.
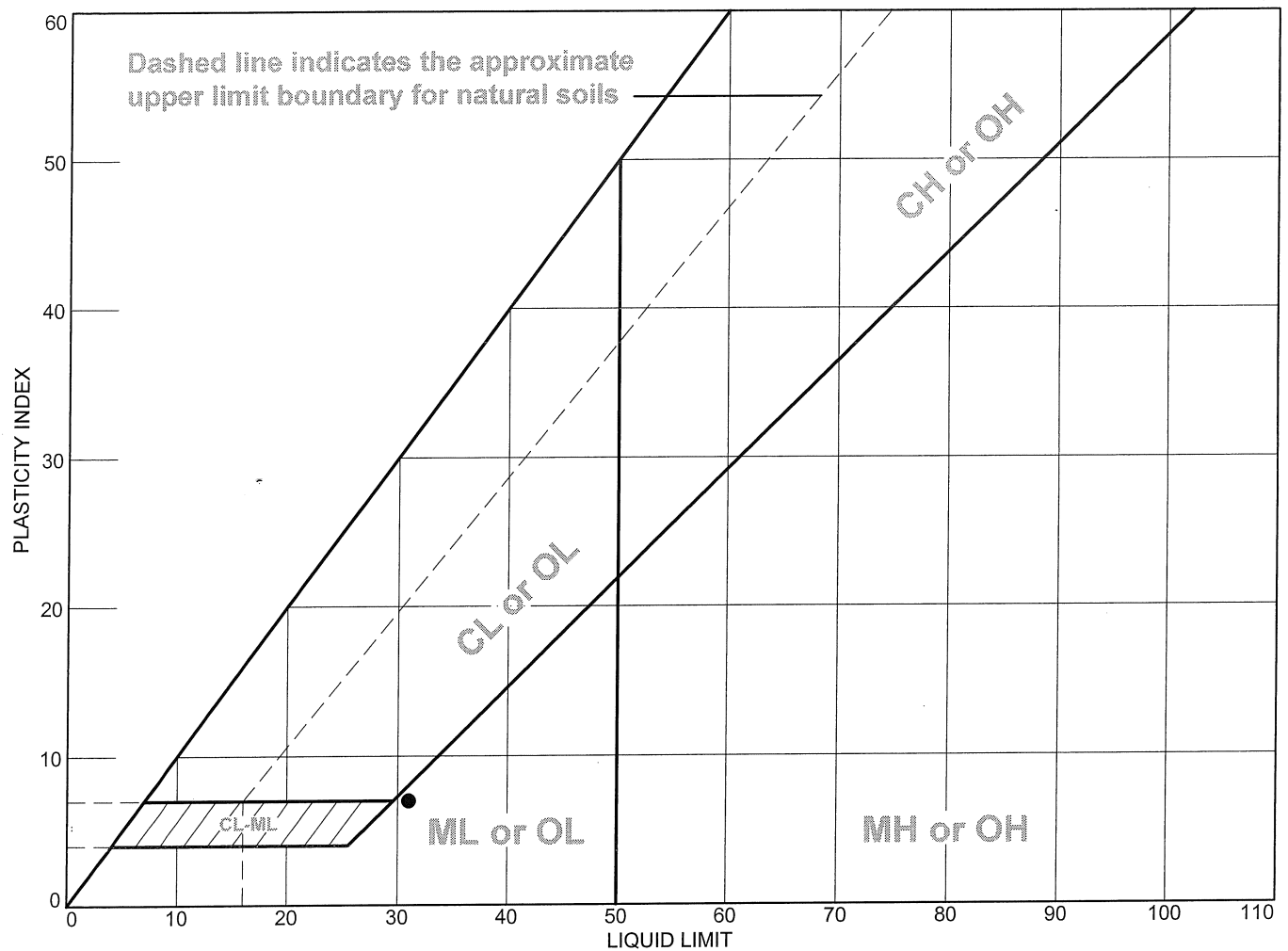
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	31	24	7		82.4	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0002R, S19   **Depth:** 70-71.5   **Sample Number:** S35514

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw
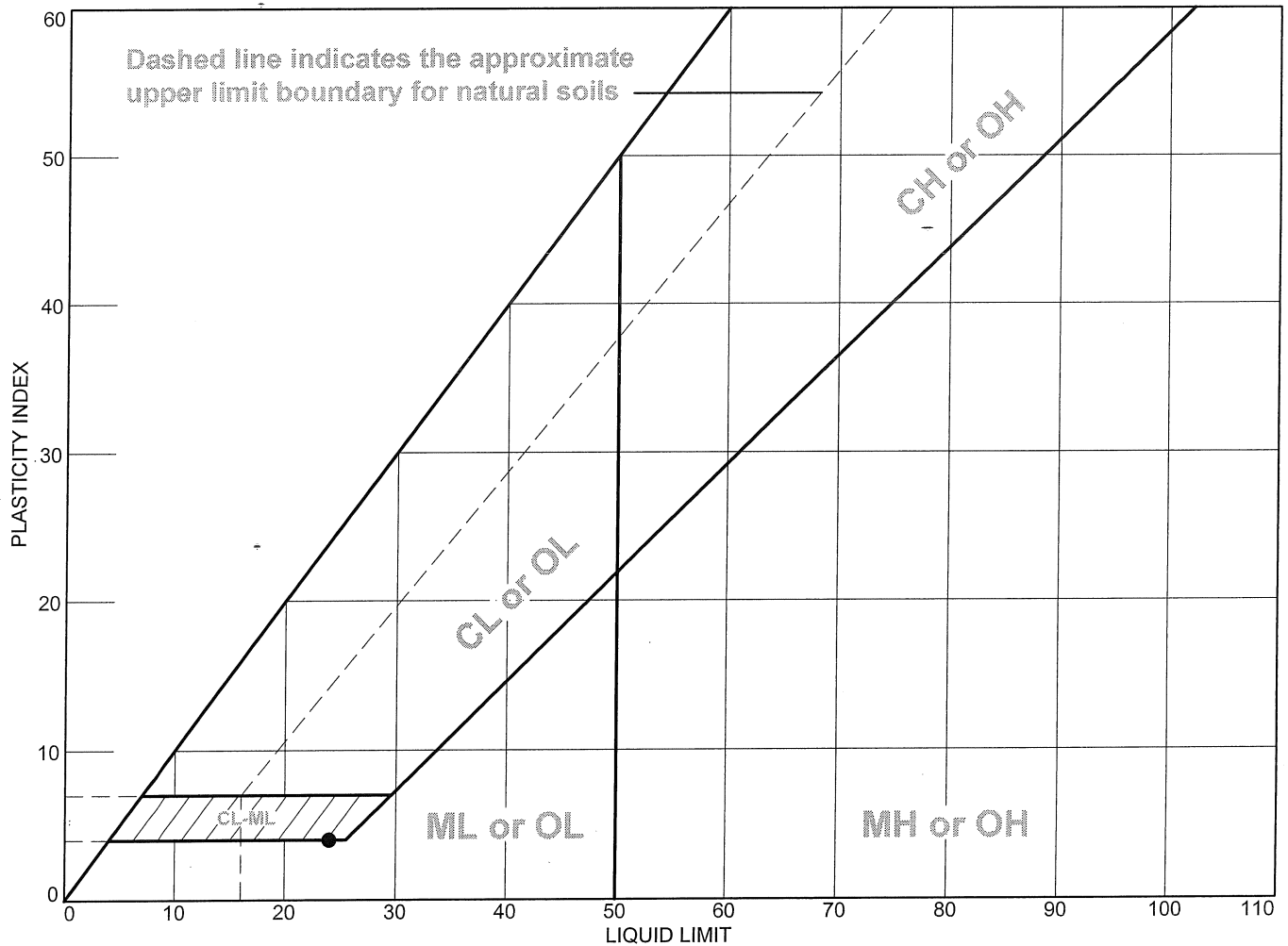
LIQUID AND PLASTIC LIMITS TEST REPORT
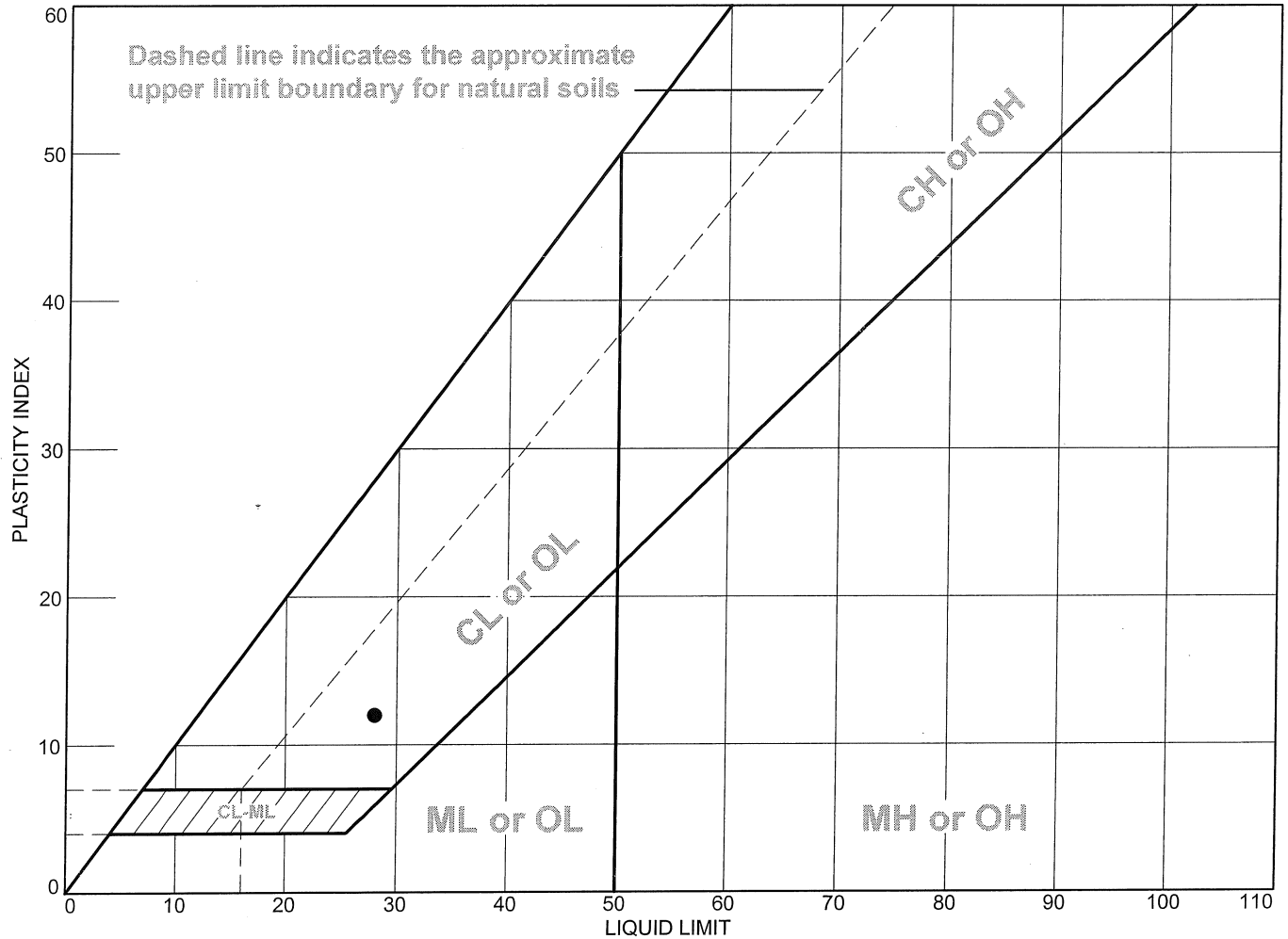
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	28	16	12		58.3	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0003R, S05   **Depth:** 9.5-11.0   **Sample Number:** S35518

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ac/jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
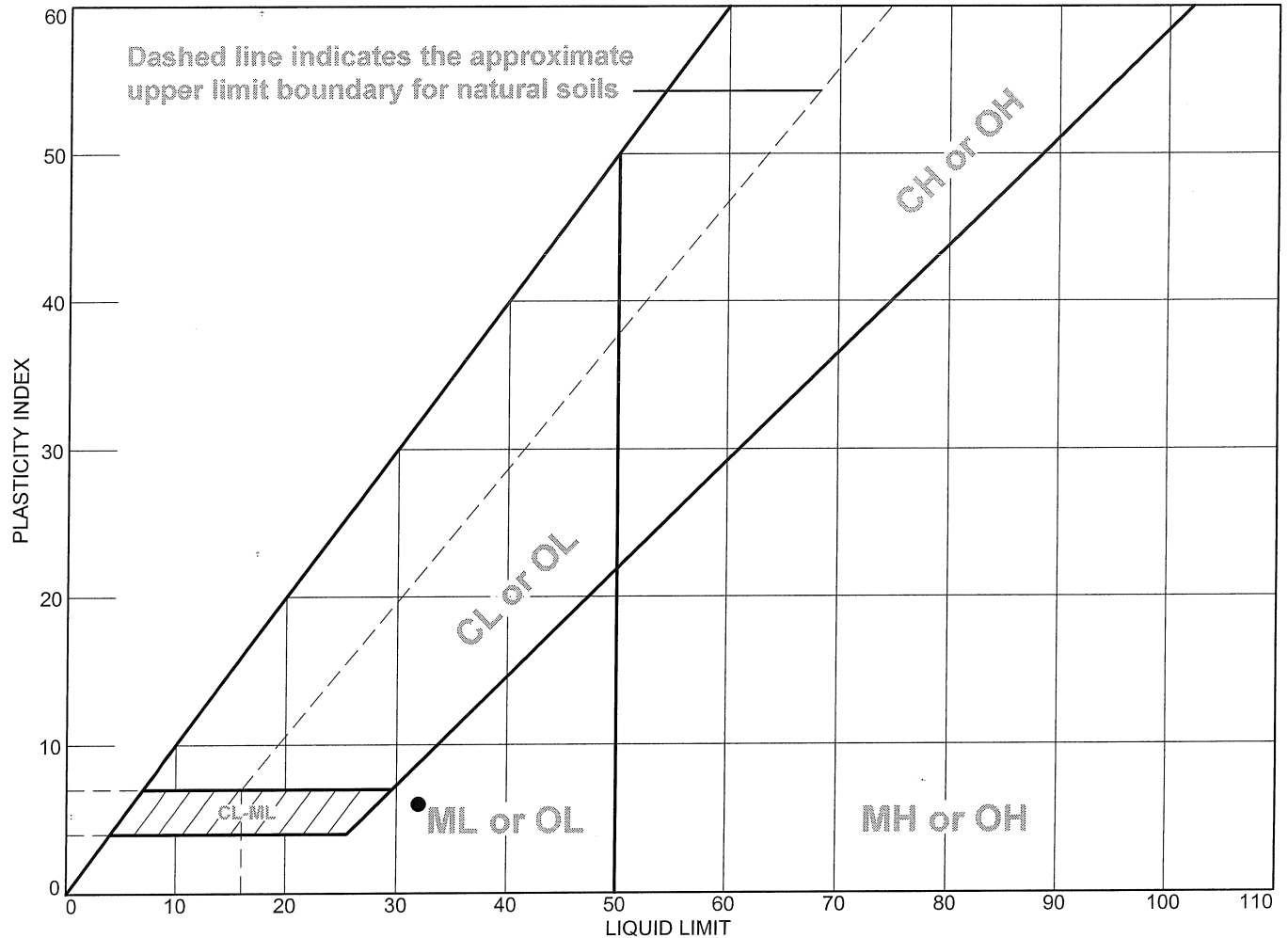
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	32	26	6		69.4	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

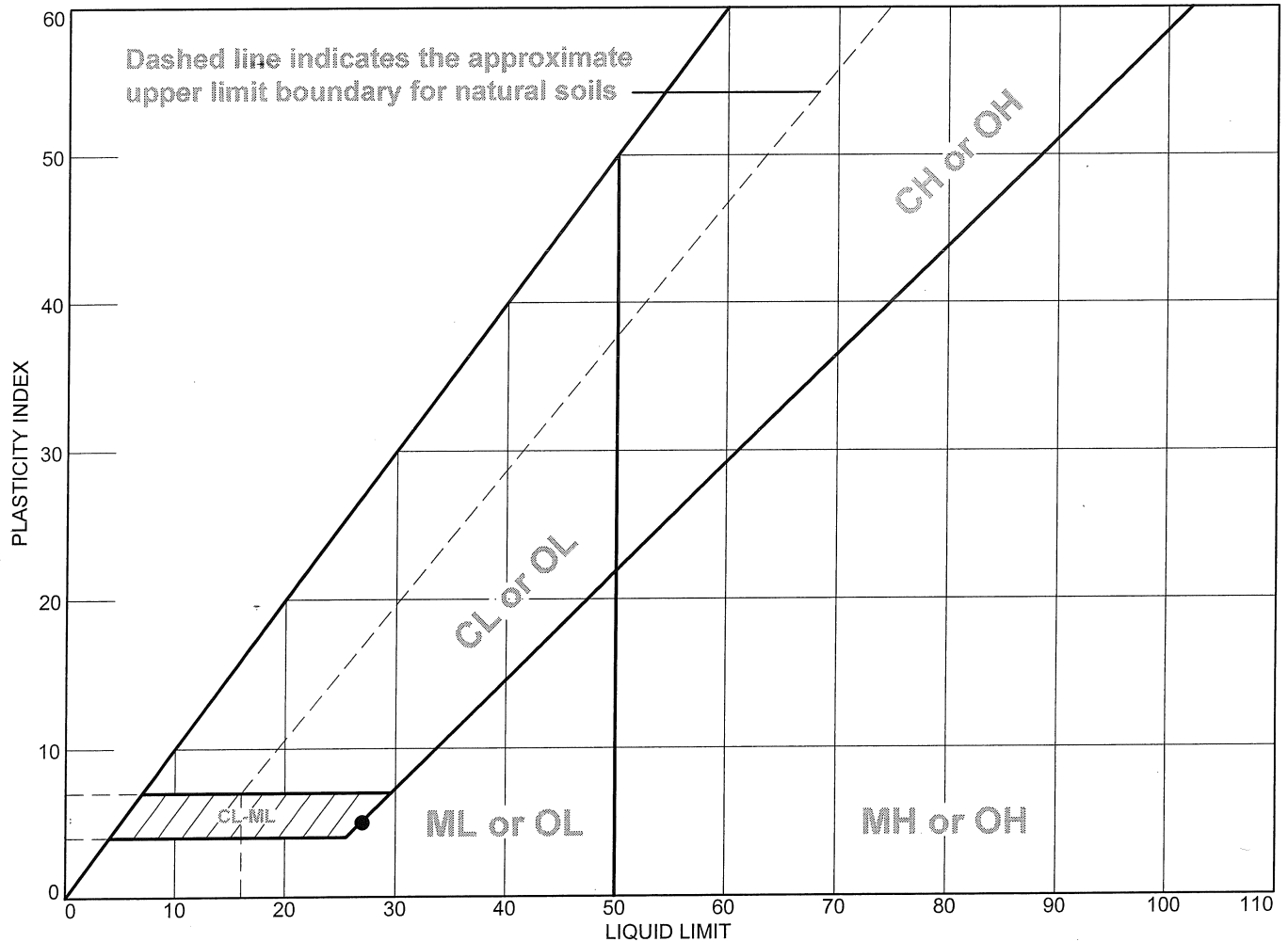**Location:** S0003R, S06 **Depth:** 11-12.5 **Sample Number:** S35519

Remarks:

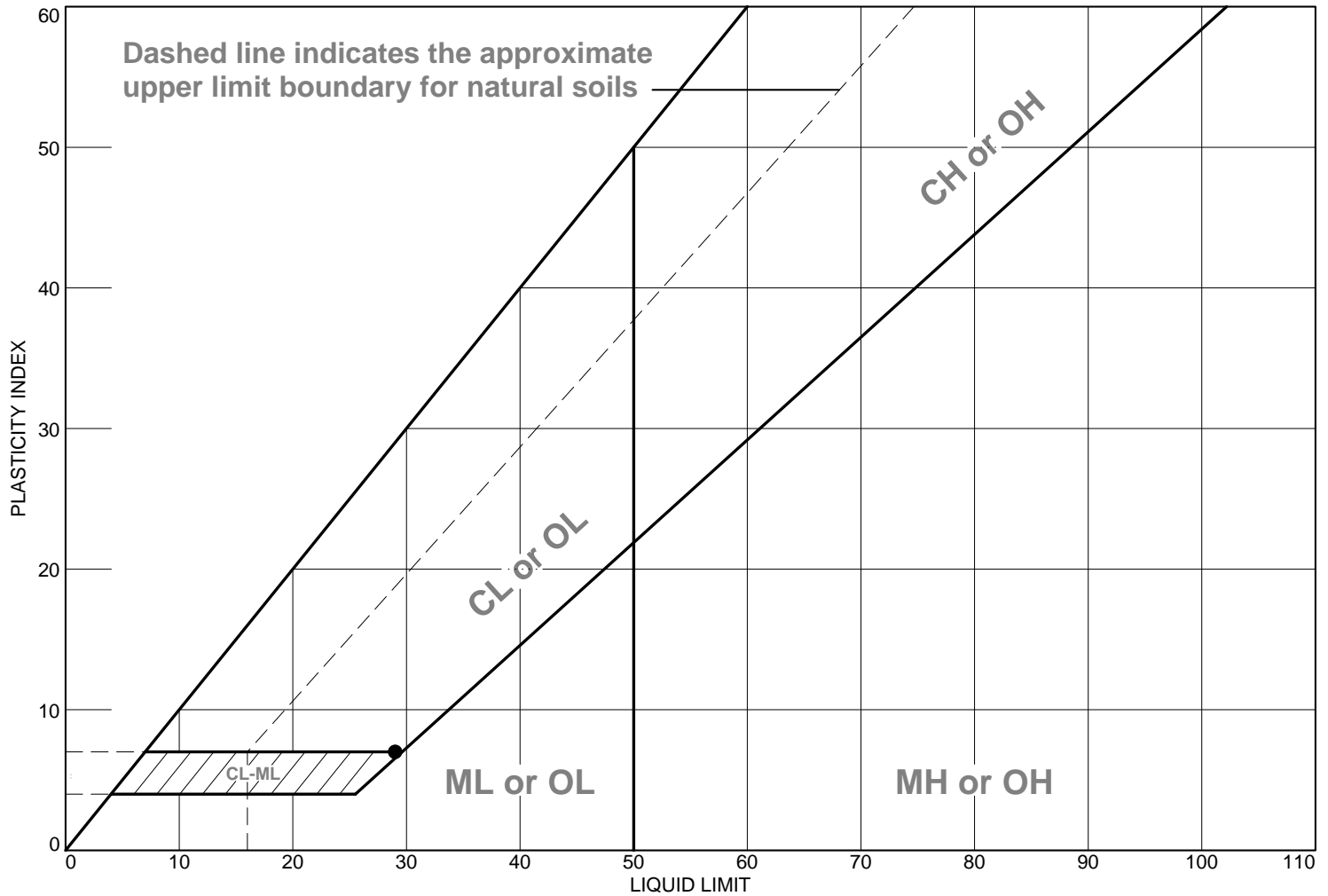**SIERRA TESTING LABS, INC.**

El Dorado Hills, CA

Figure

Tested By: ac/jl **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
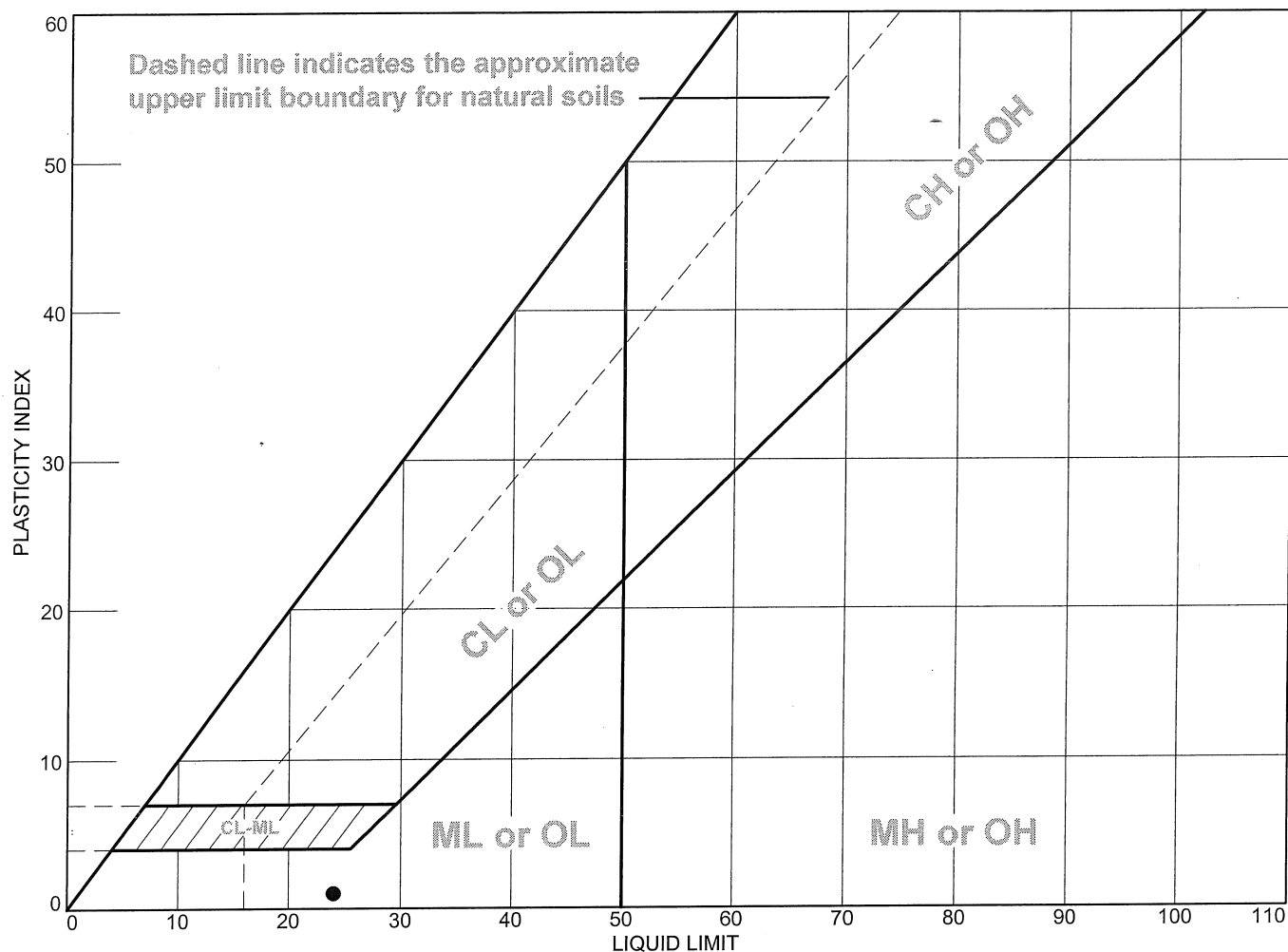
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	24	23	1	99.0	91.2	ML

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0003R, S09   **Depth:** 20-21.5   **Sample Number:** S35520

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils
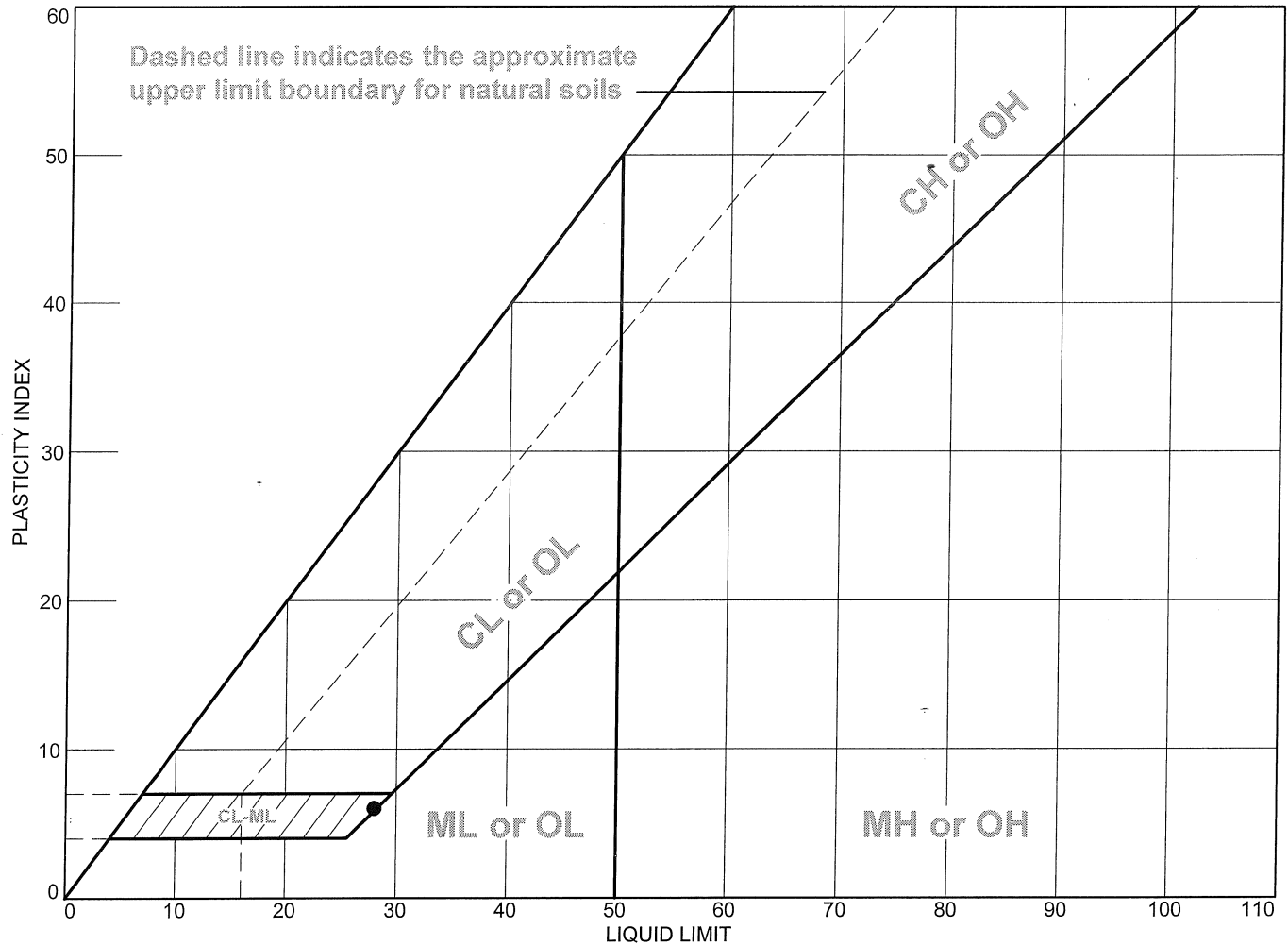
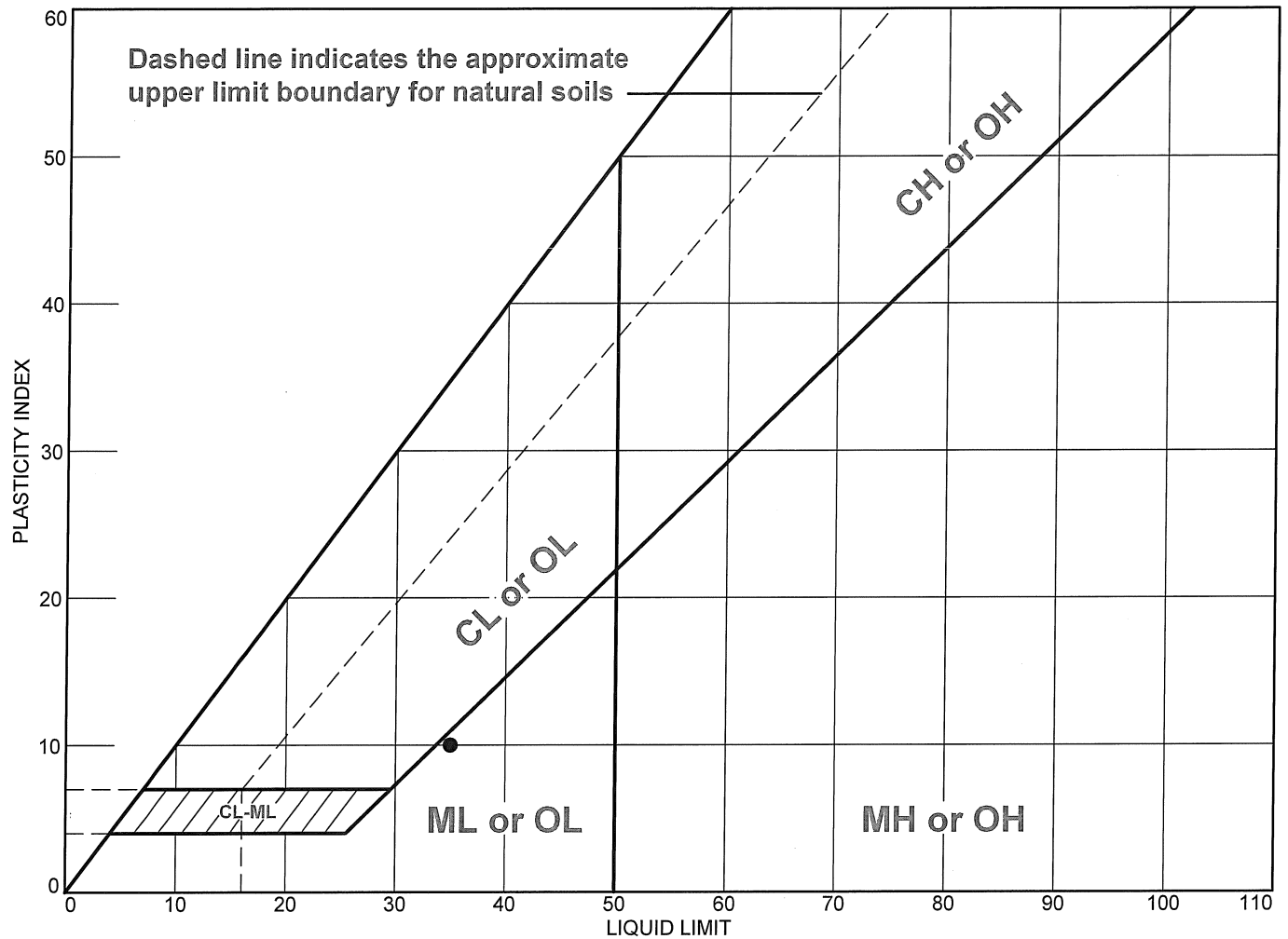| MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	28	22	6		88.3	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0003R, S12   **Depth:** 35-36.5   **Sample Number:** S35521

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ac/jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

PLASTICITY INDEX (y-axis, 0 to 60)
LIQUID LIMIT (x-axis, 0 to 110)

CH or OH
CL or OL
CL-ML
ML or OL
MH or OH
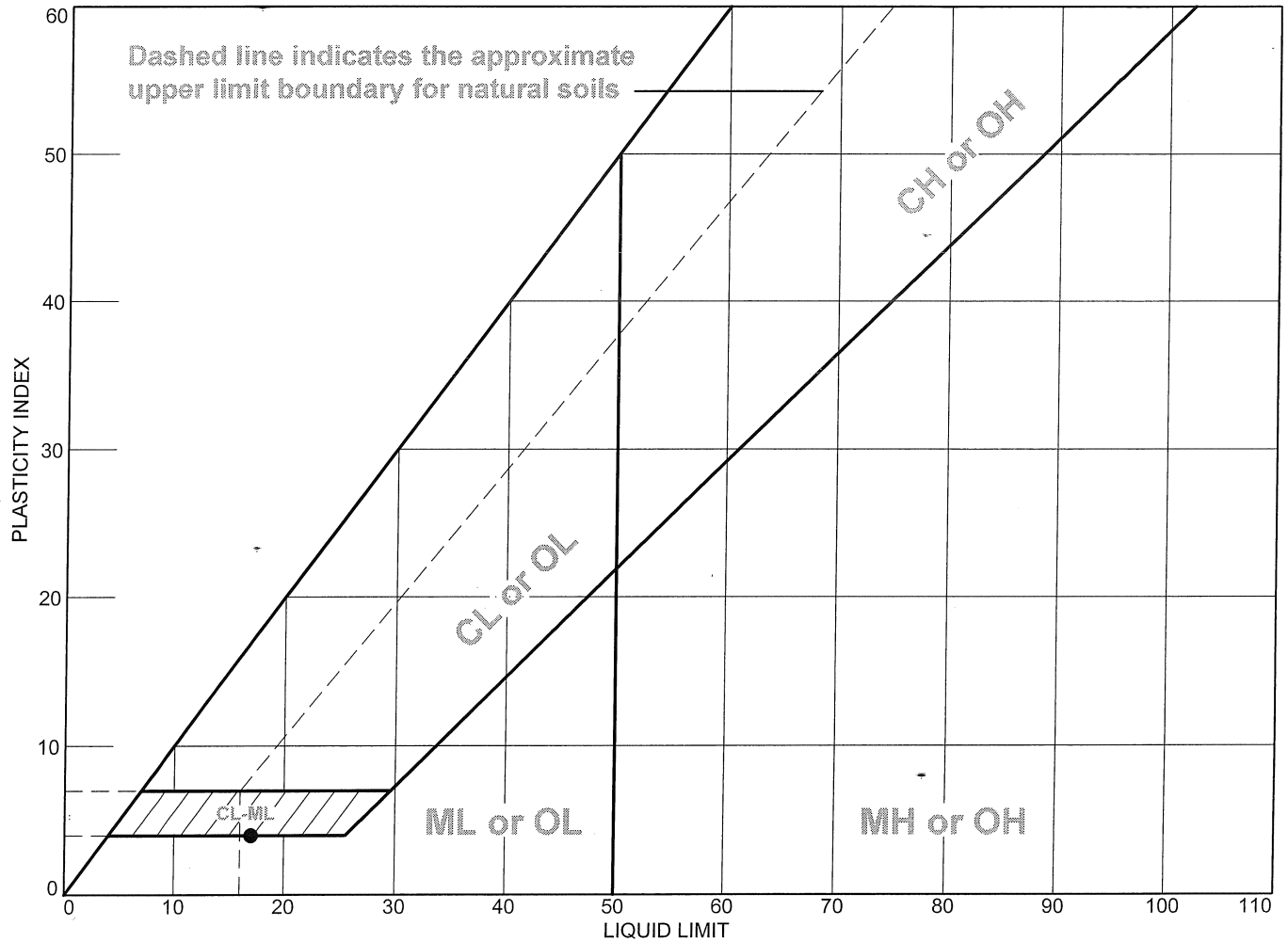
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	17	13	4		53.6	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0003R, S13   **Depth:** 40-41.5   **Sample Number:** S35522
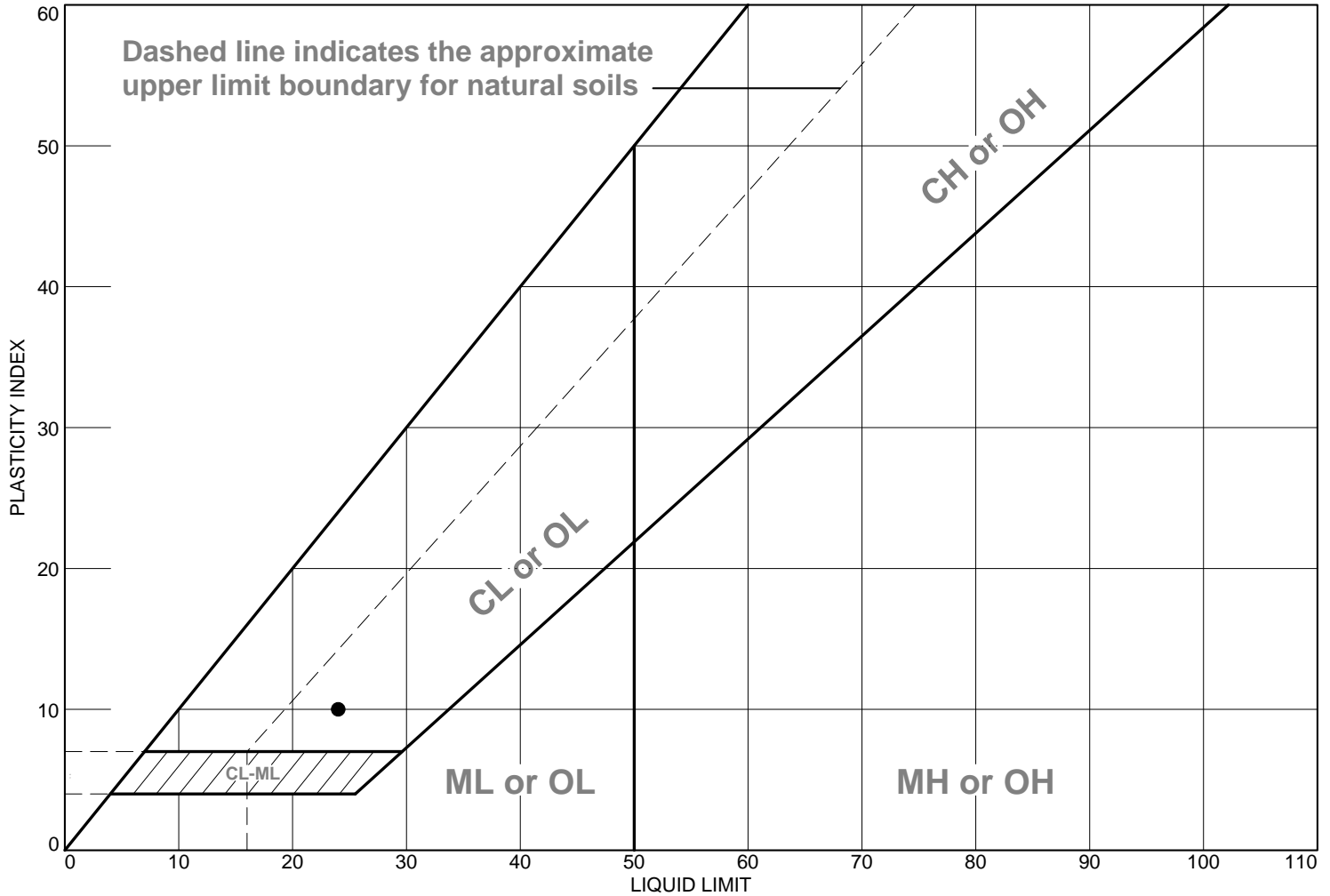
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
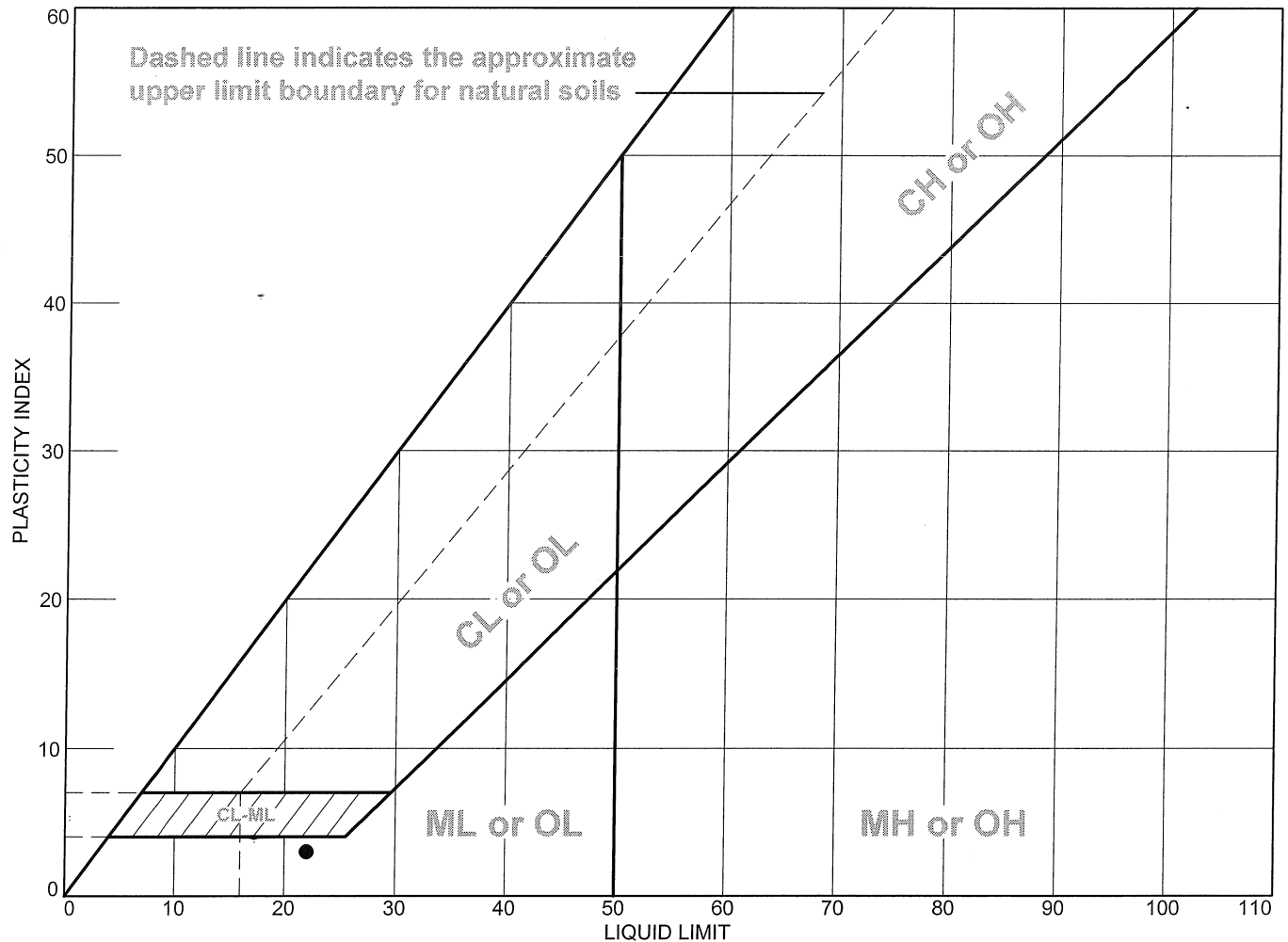
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	22	19	3		85.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0003R, S16B   **Depth:** 55.4-56.5   **Sample Number:** S35523

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT



Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX (vertical axis): 0, 10, 20, 30, 40, 50, 60

LIQUID LIMIT (horizontal axis): 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110
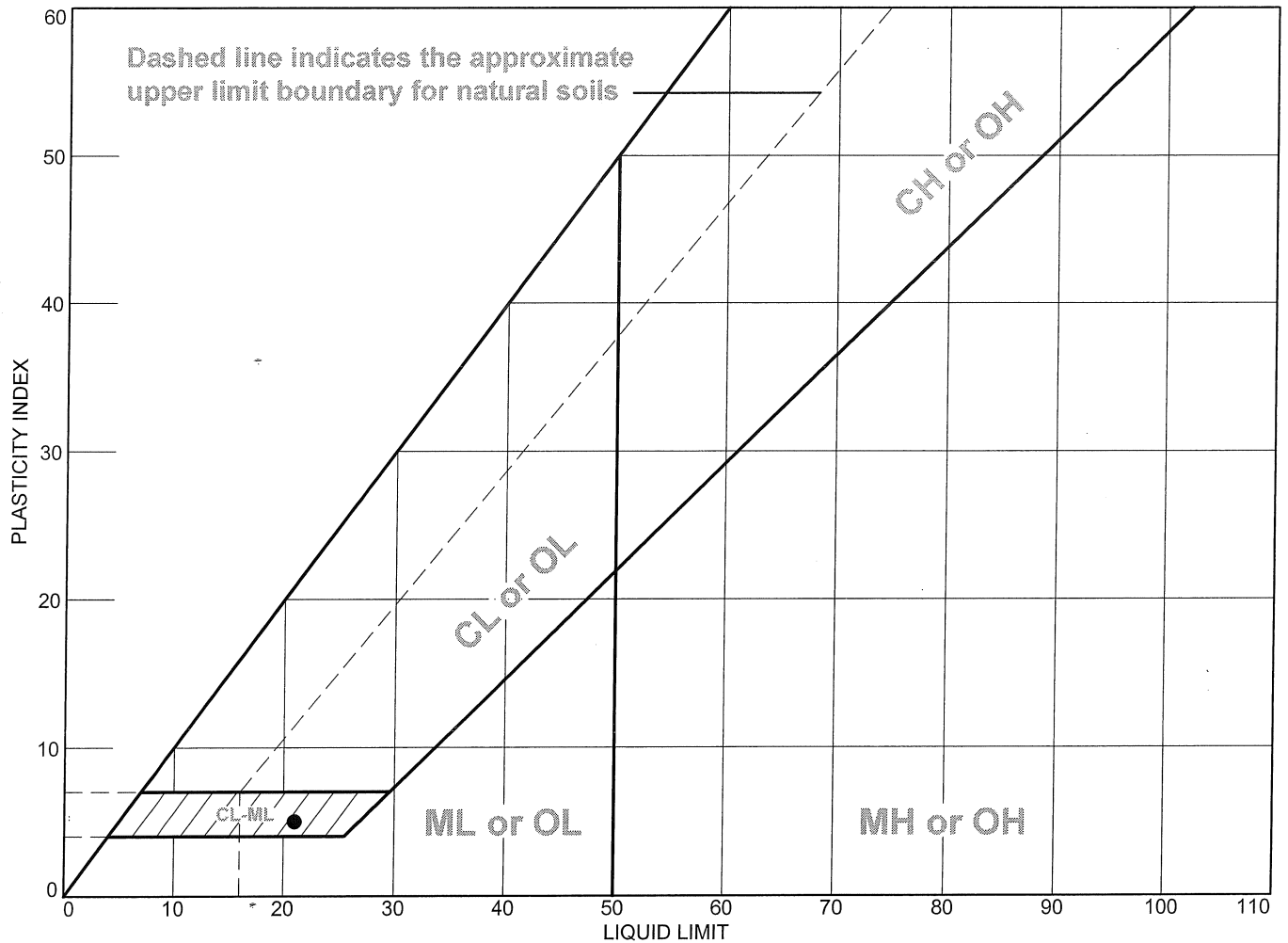
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	21	16	5		50.7	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

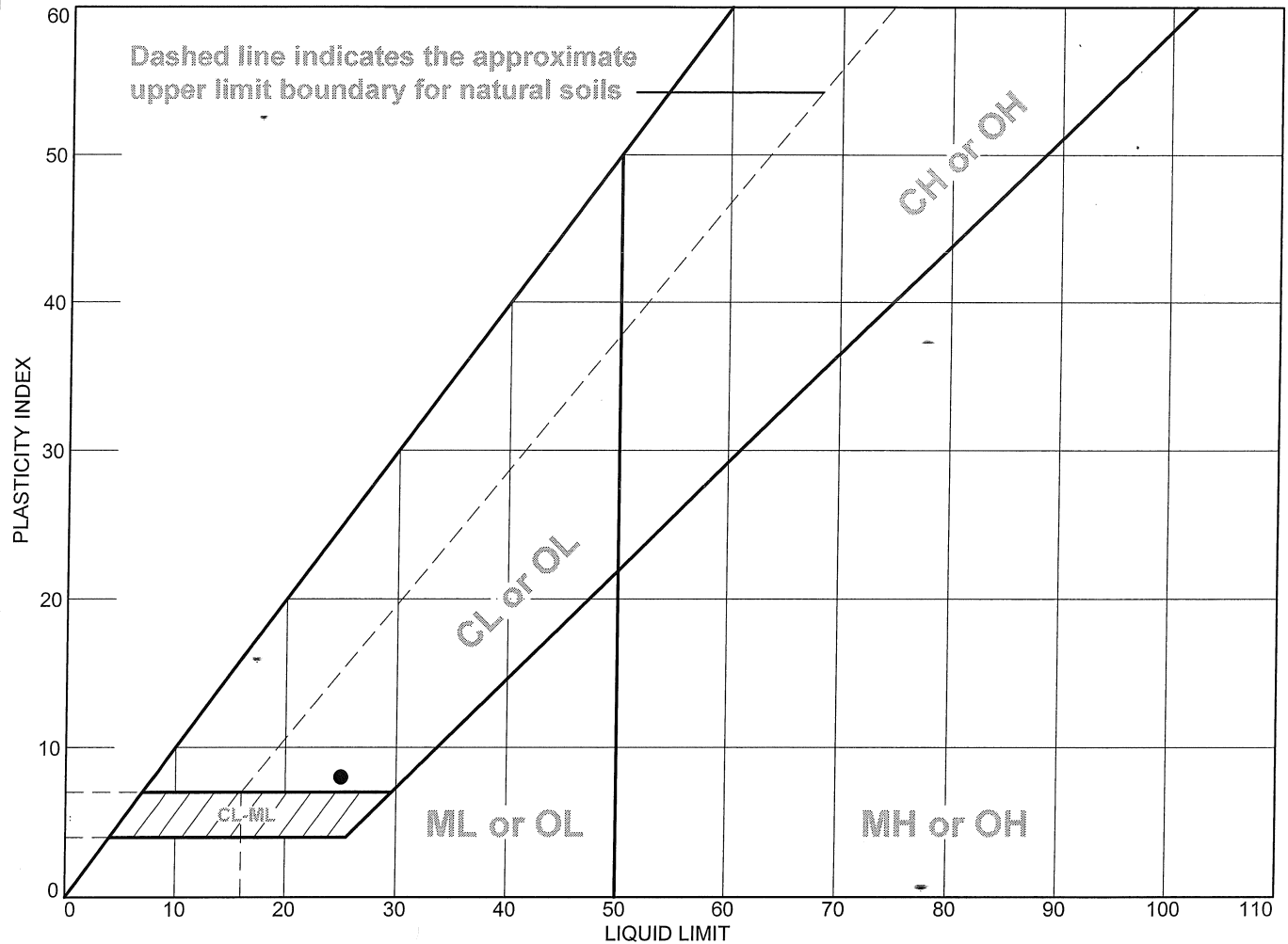**Location:** S0003R, S17 **Depth:** 60-61.5 **Sample Number:** S35524

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
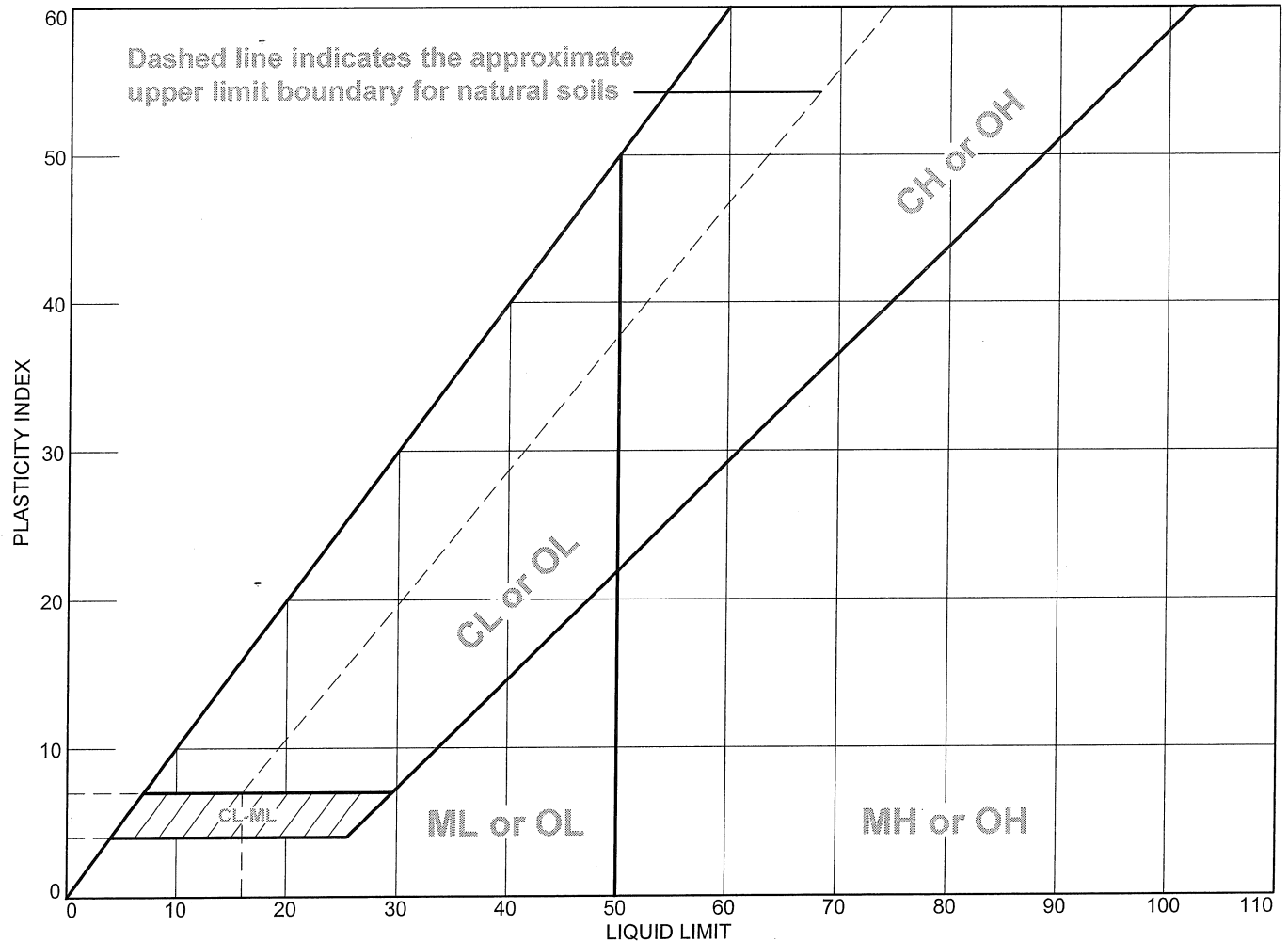
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	NV	NP	NP		91.6	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0003R, S20   **Depth:** 75-76.5   **Sample Number:** S35525

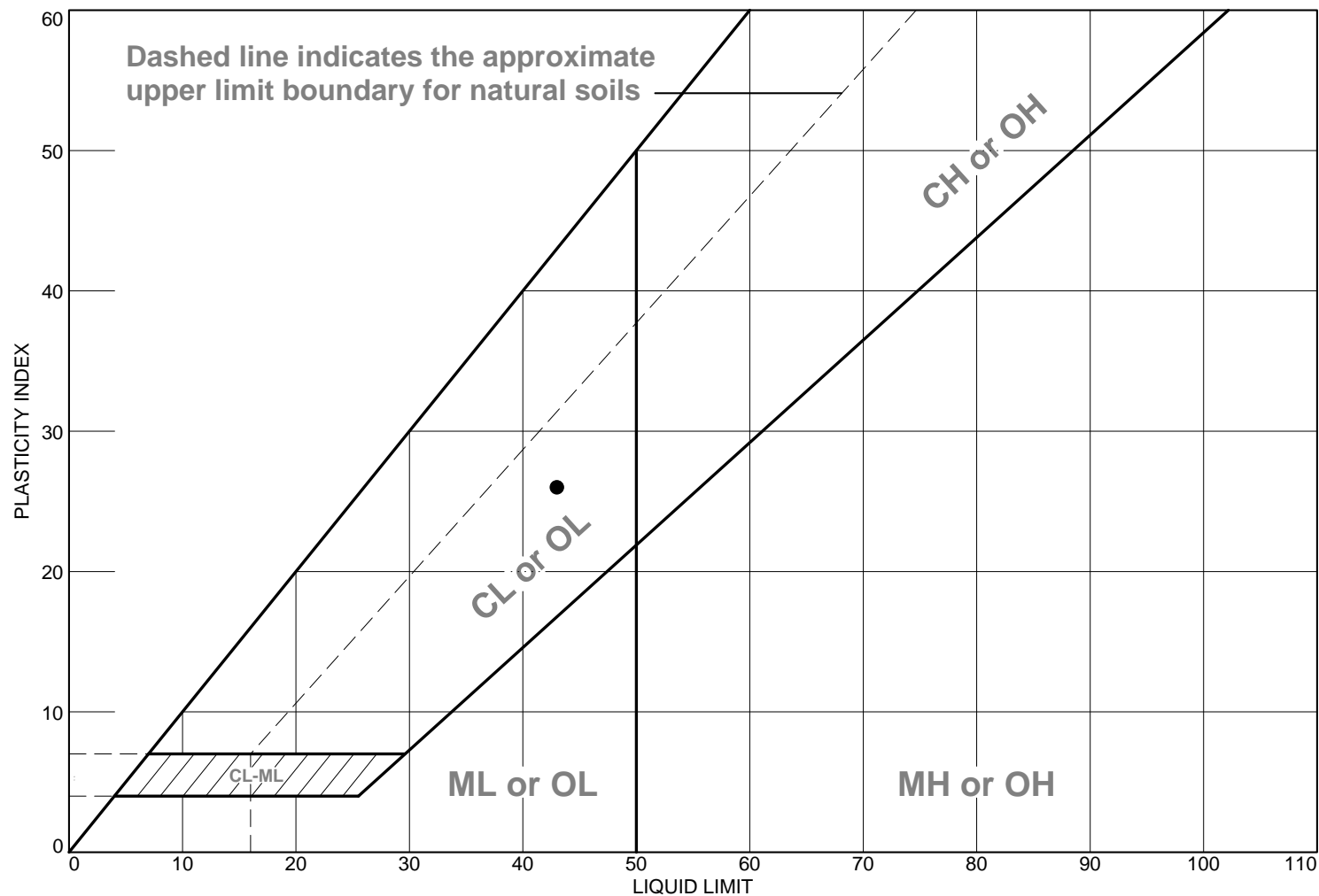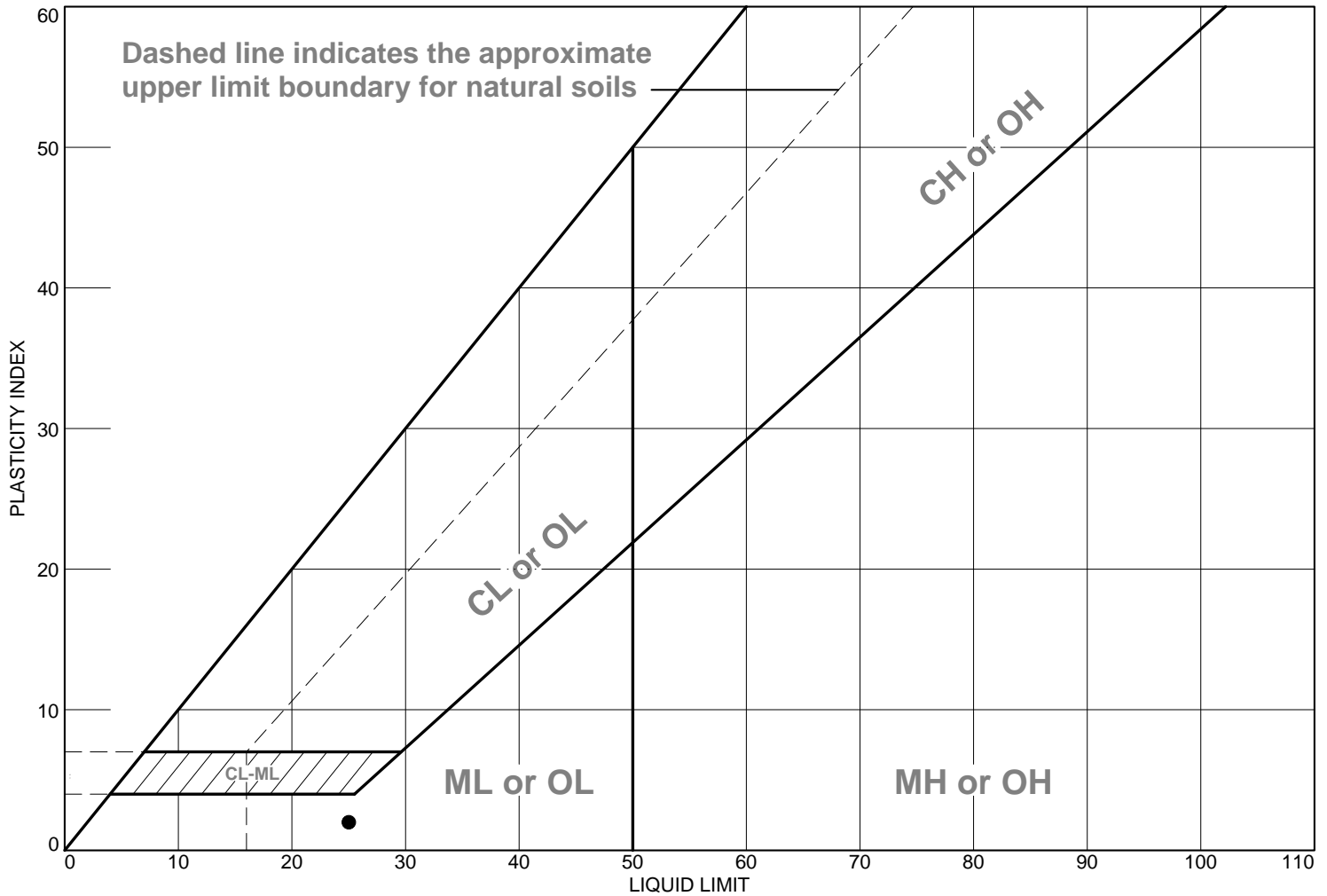**Remarks:**

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
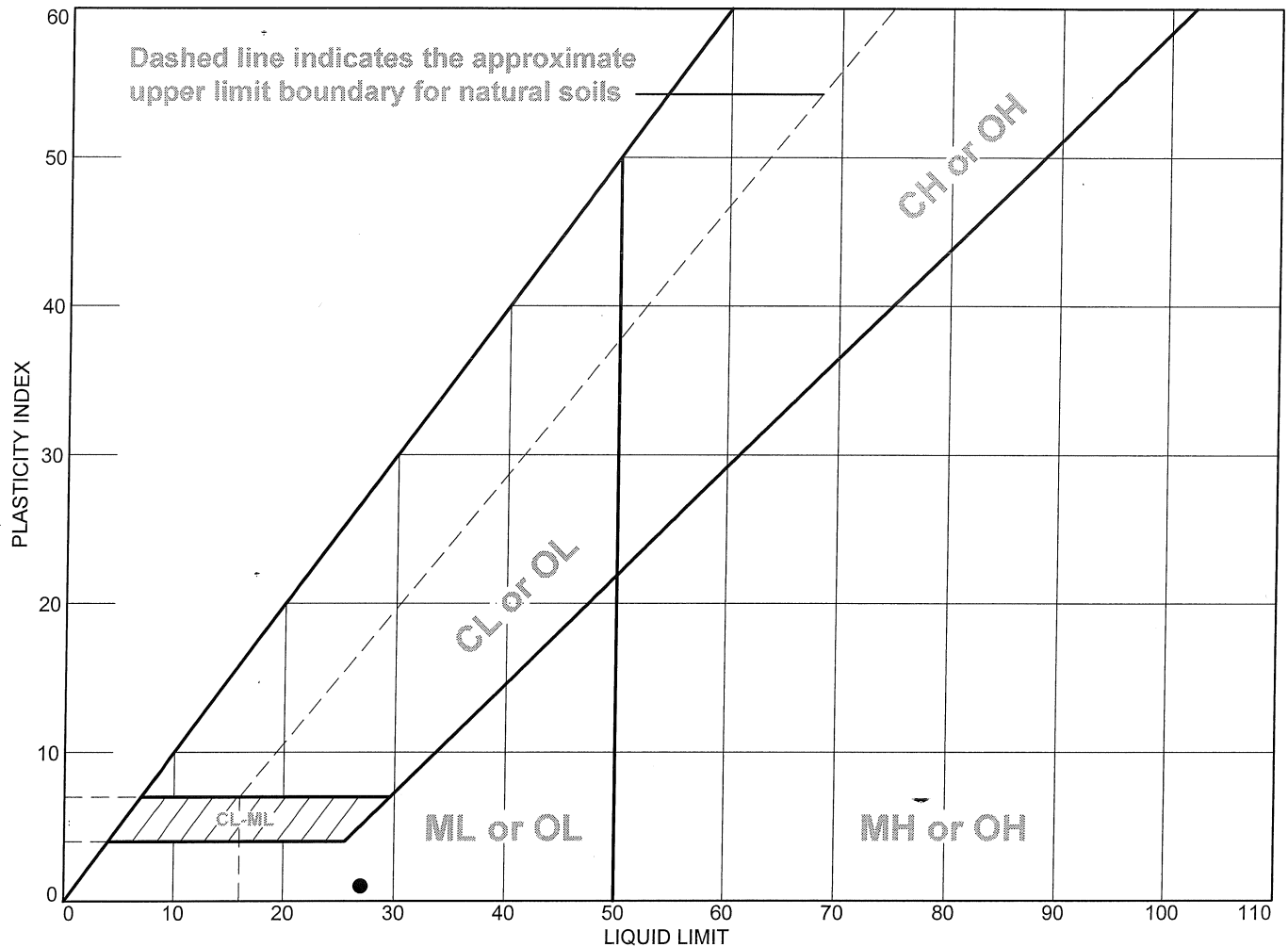
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	27	26	1		59.9	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0004R, S03   **Depth:** 6.5-7.9   **Sample Number:** S35526

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT
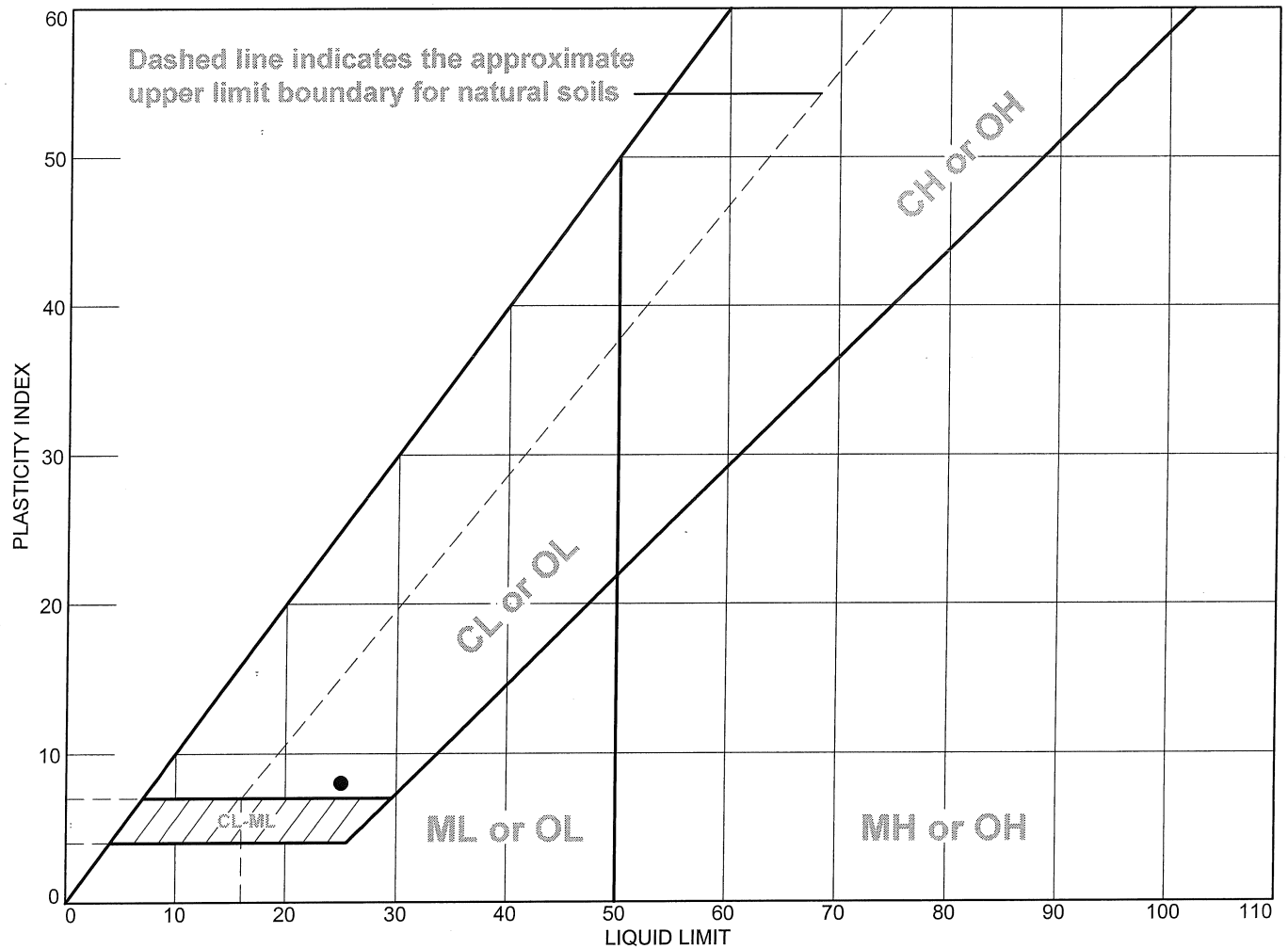
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	25	17	8		55.8	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0004R, S05A   **Depth:** 9.5-10.5   **Sample Number:** S35527

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw
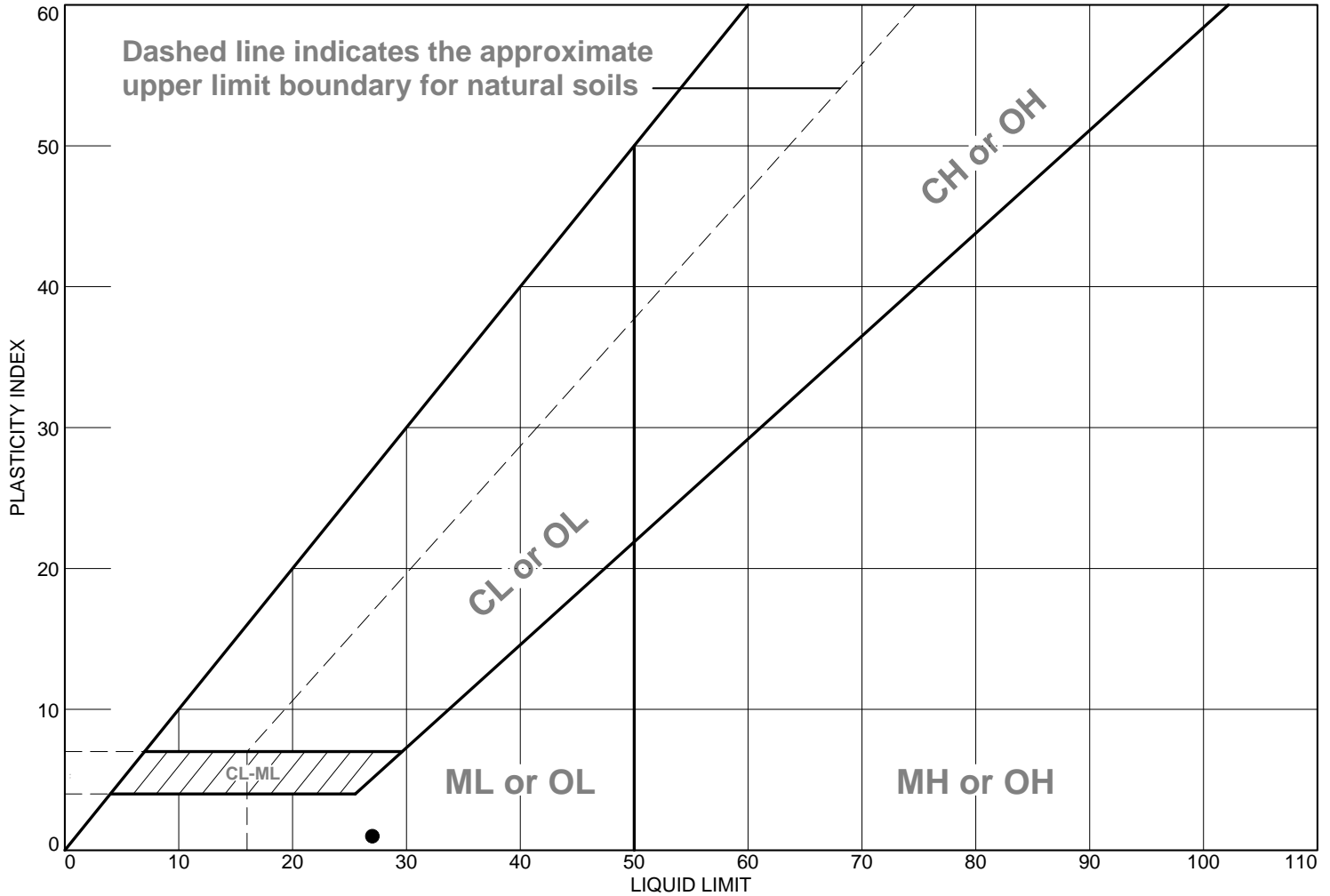
LIQUID AND PLASTIC LIMITS TEST REPORT
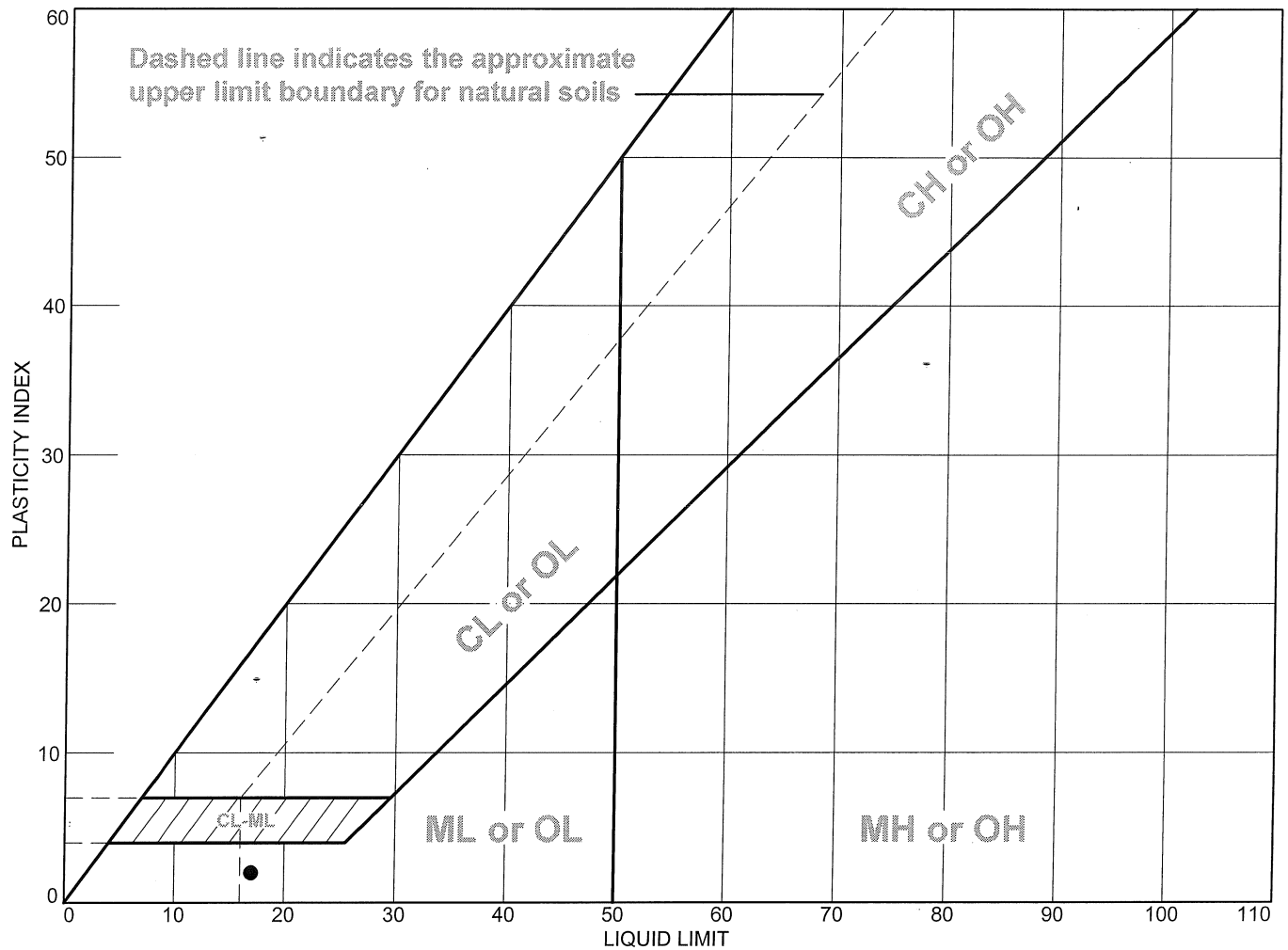
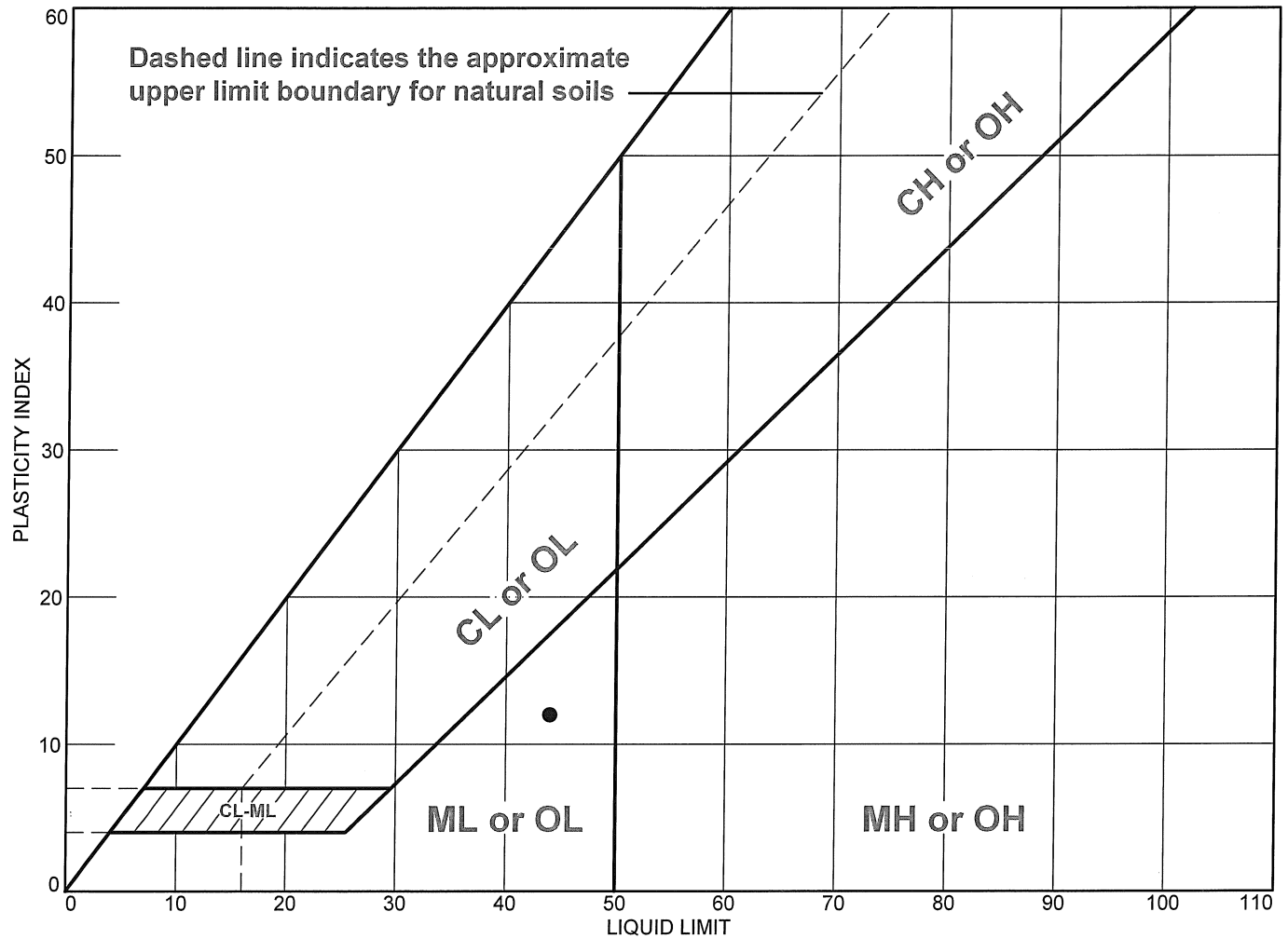| MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	17	15	2		52.1	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0004R, S06B   **Depth:** 11.6-12.5   **Sample Number:** S35528

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
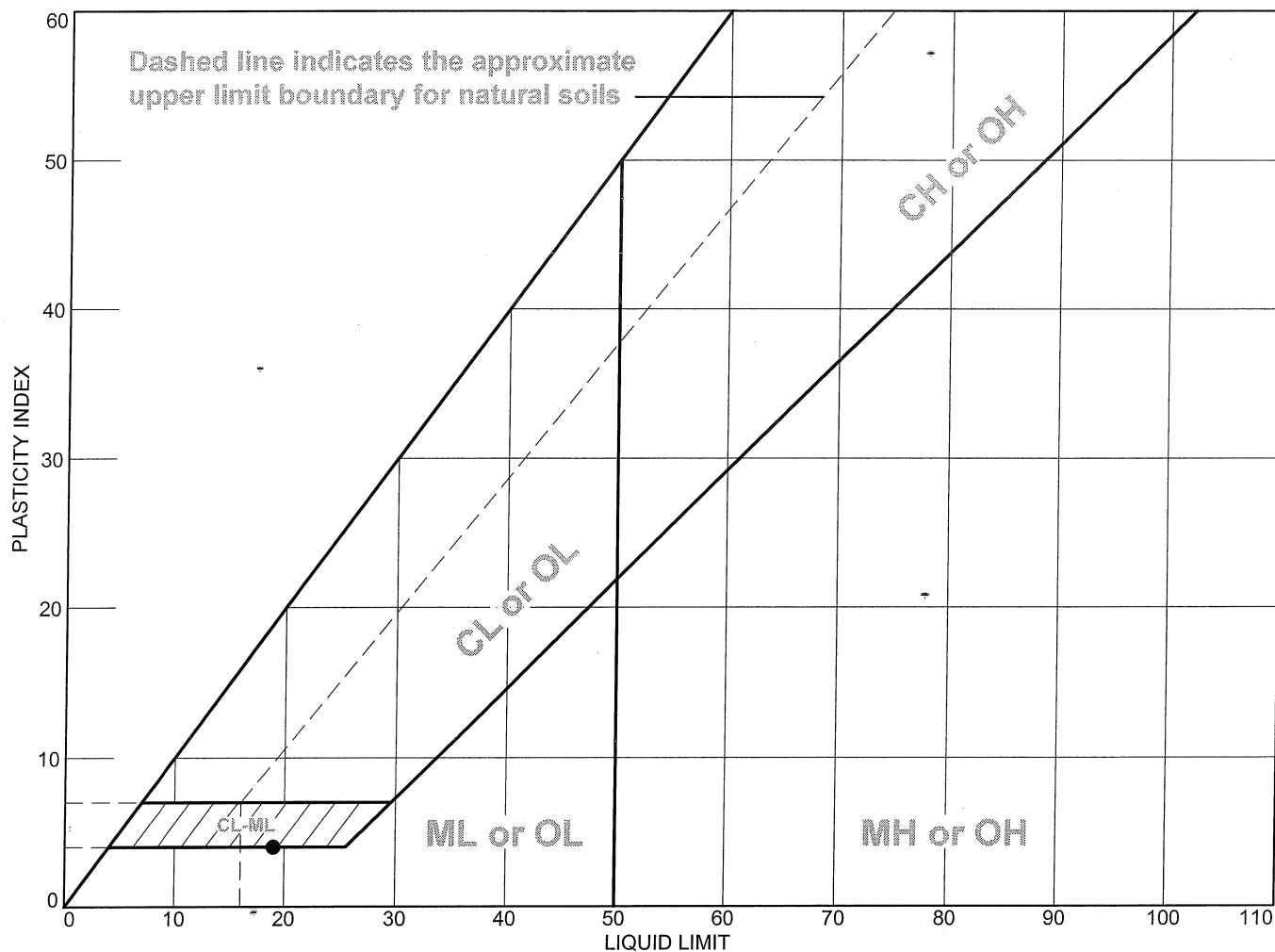
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	19	15	4		65.4	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0004R, S07   **Depth:** 12.5-13.1   **Sample Number:** S35529
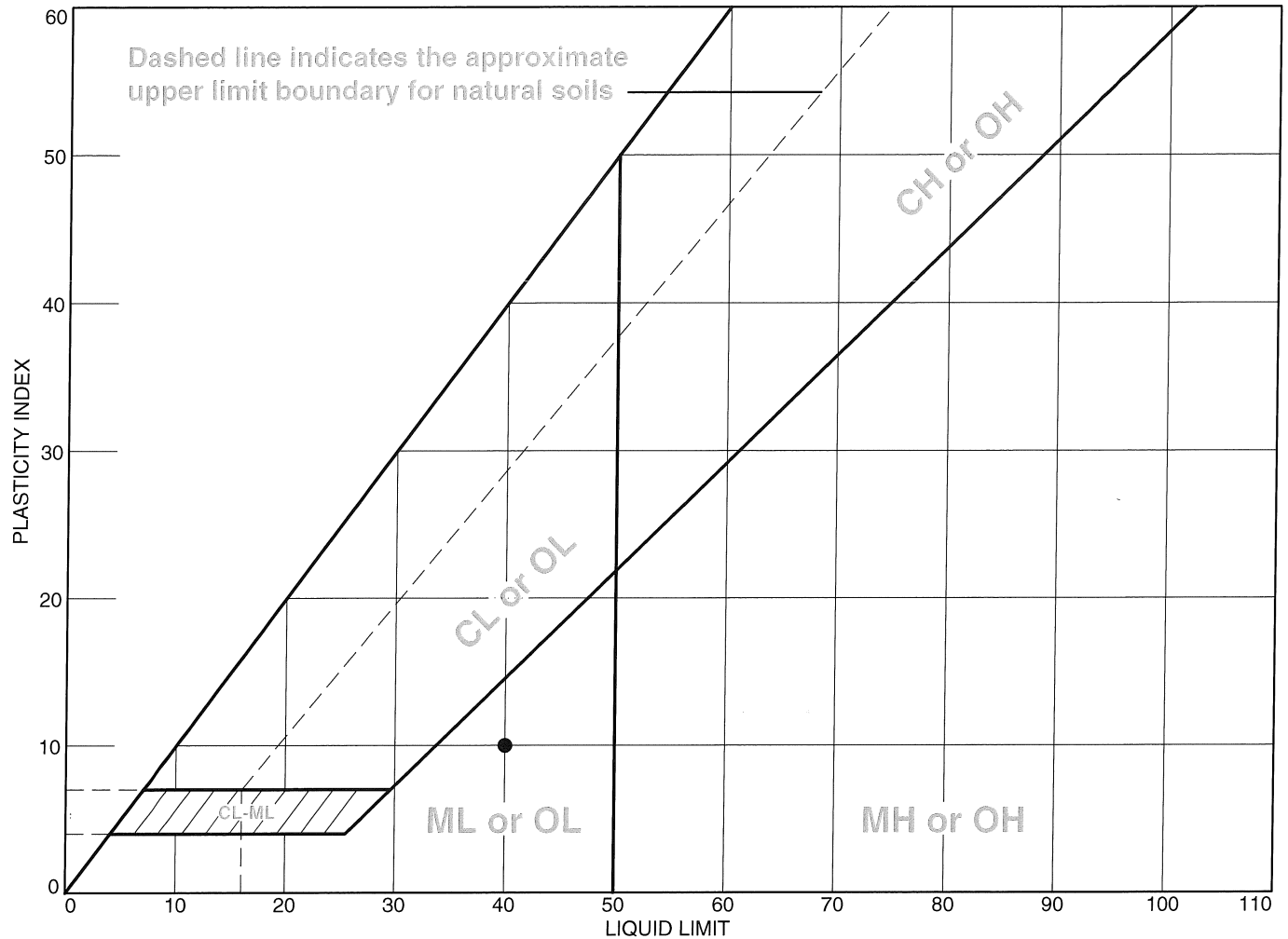
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

PLASTICITY INDEX (y-axis, 0 to 60)

LIQUID LIMIT (x-axis, 0 to 110)

Chart zones: CH or OH, CL or OL, CL-ML, ML or OL, MH or OH
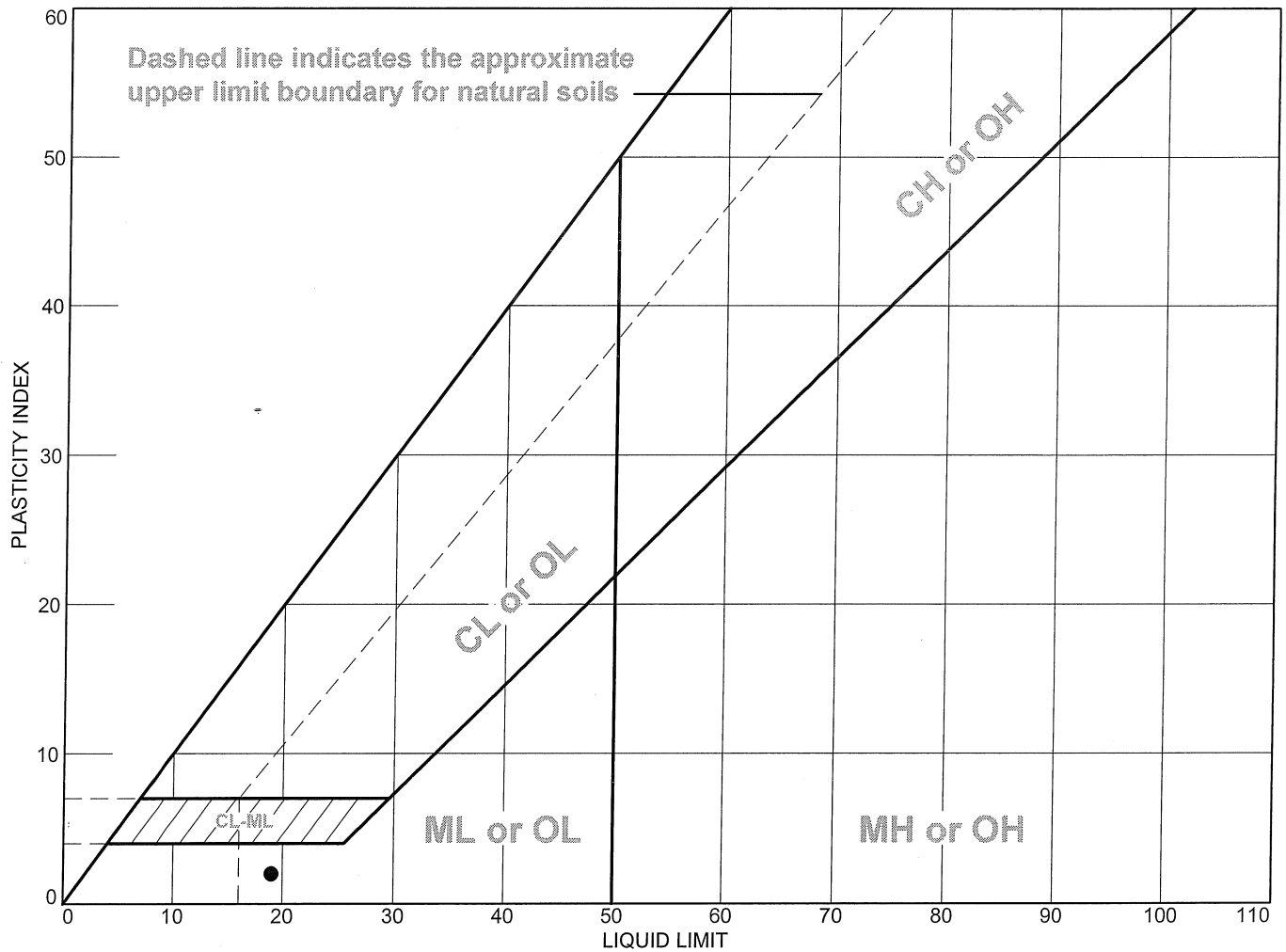
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	19	17	2		65.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

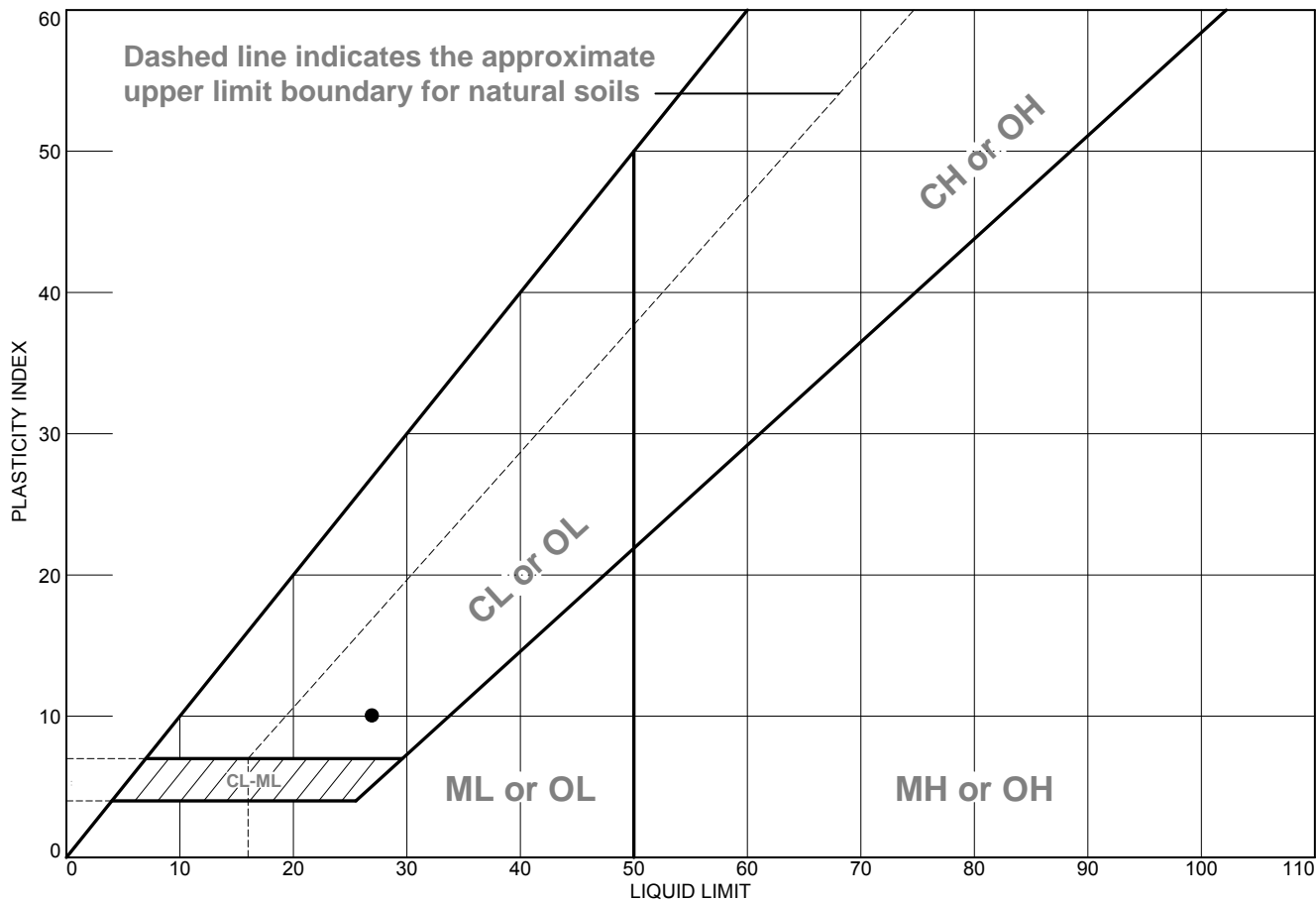**Location:** S0004R, S08   **Depth:** 14-15.5   **Sample Number:** S35530

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ac/jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
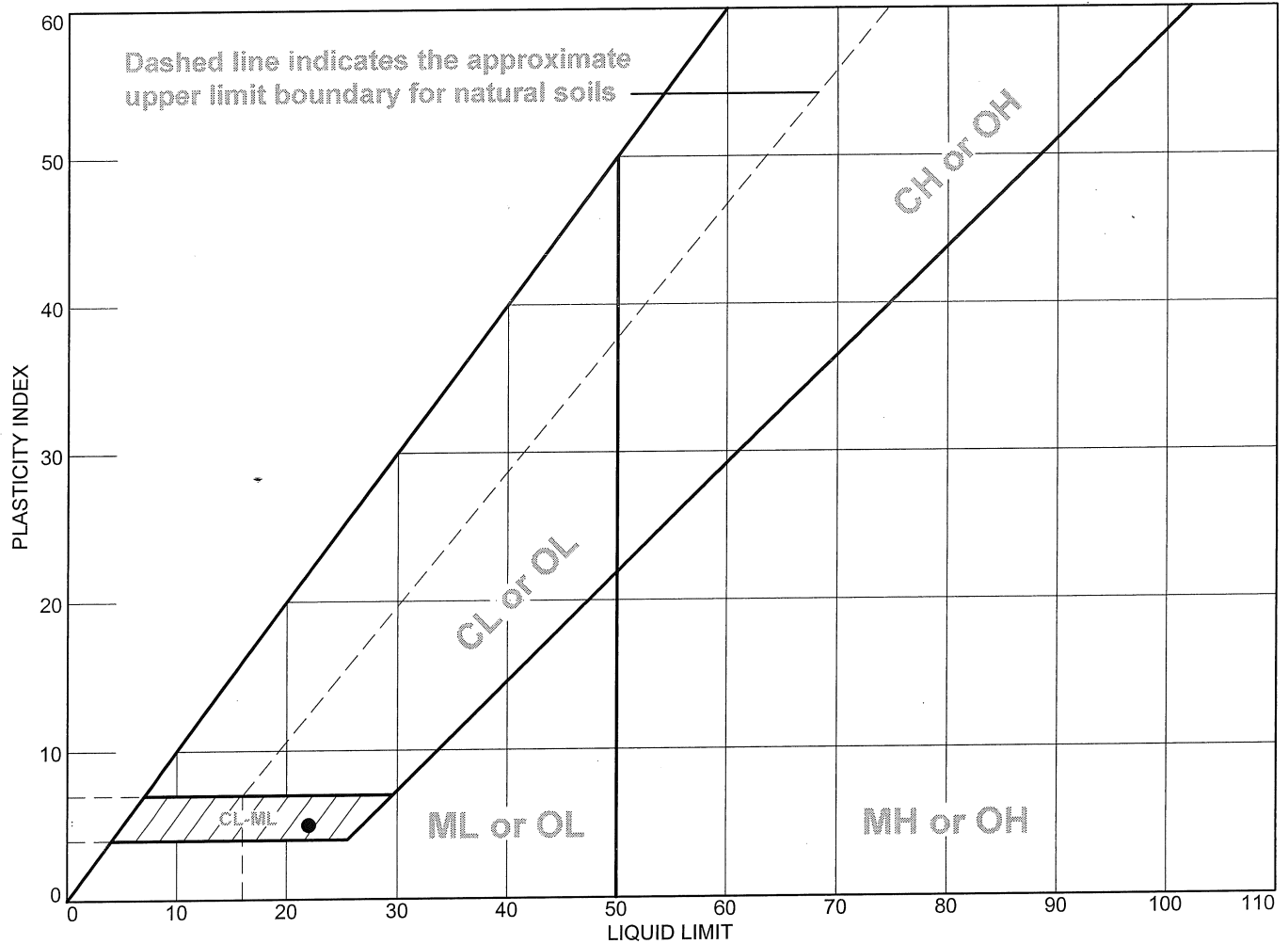
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	22	17	5		60.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: SS0004R, S14   **Depth:** 45-45.9   **Sample Number:** S35532
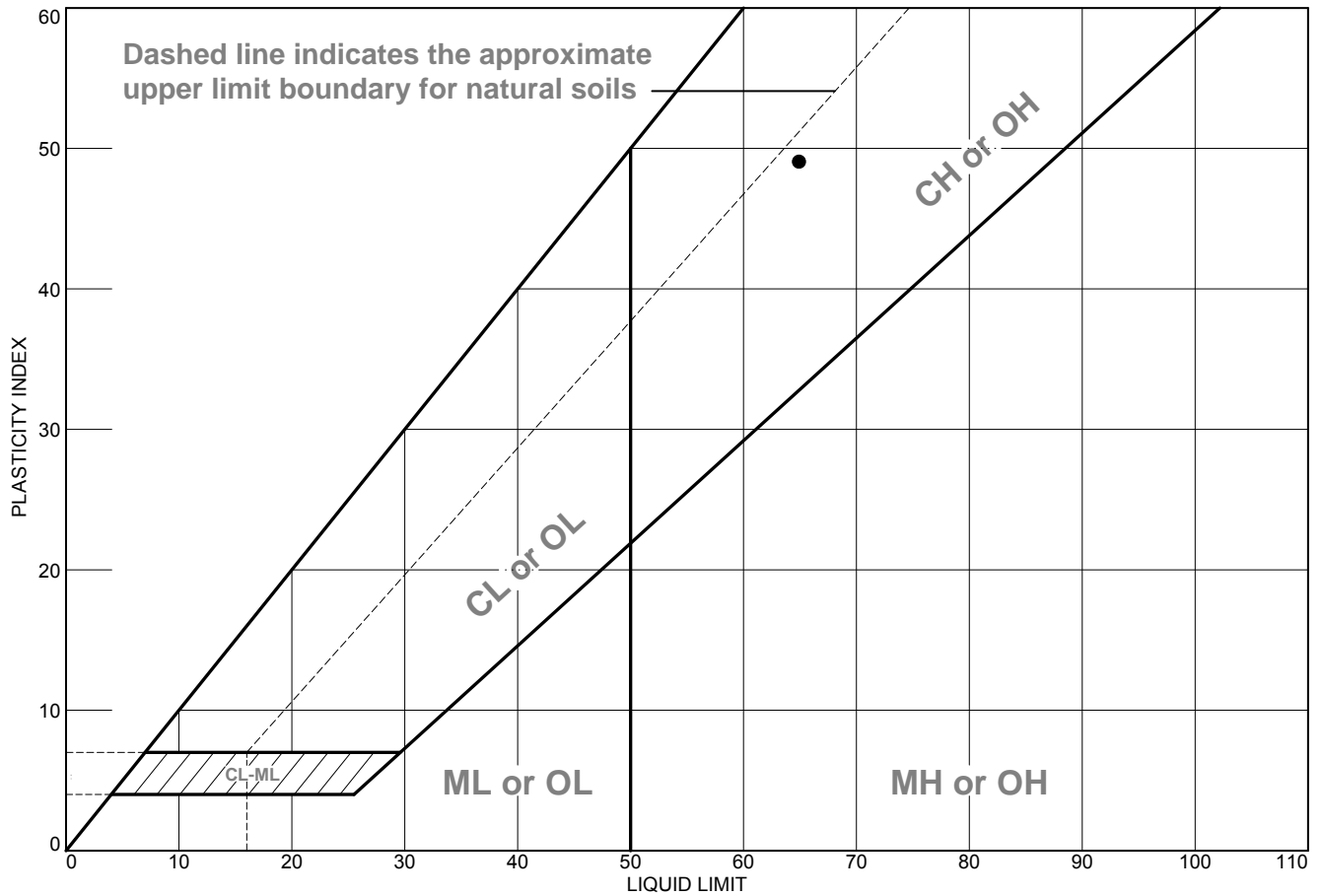
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

PLASTICITY INDEX

LIQUID LIMIT

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH
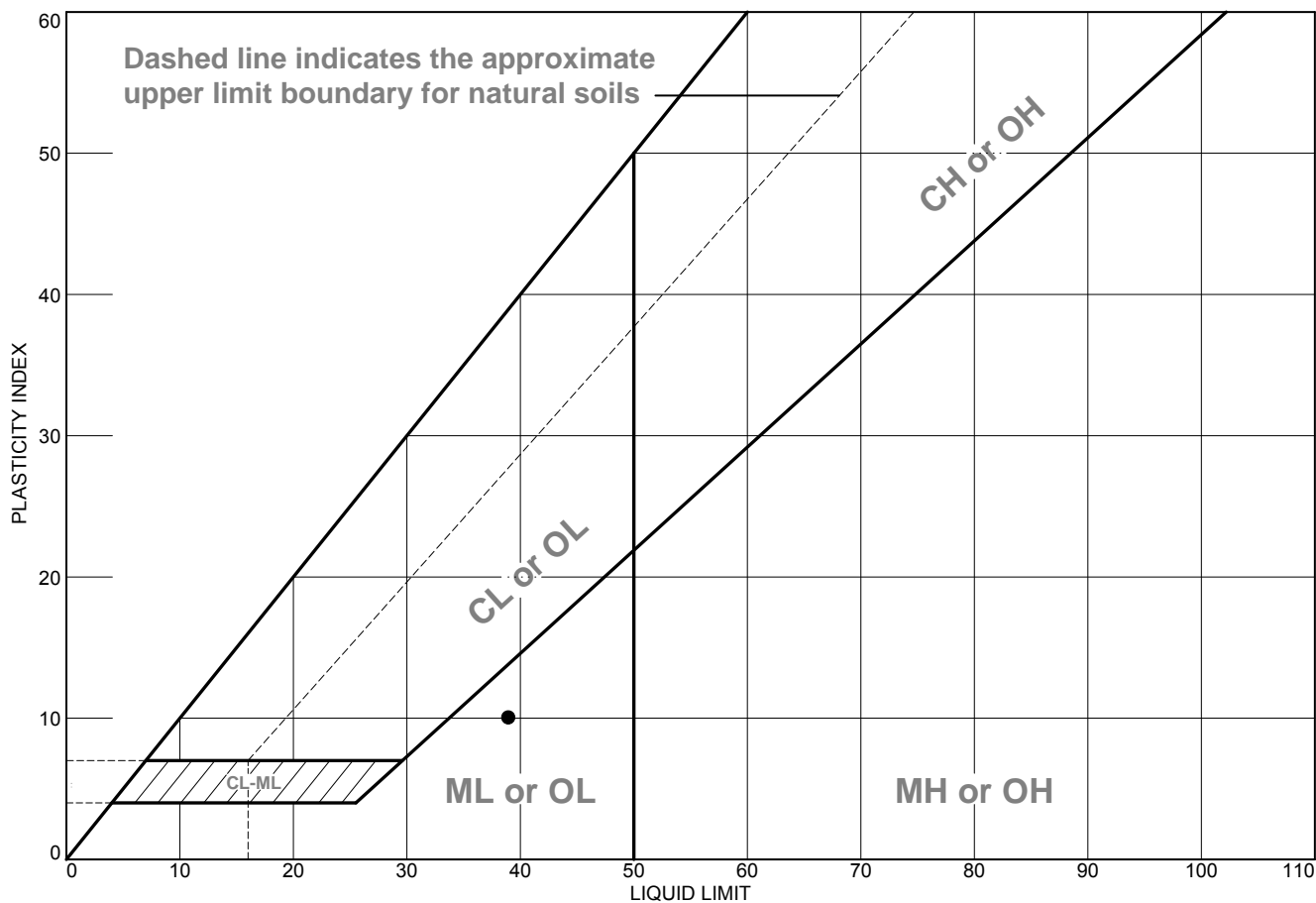
	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		39	29	10	94.5	82.9	ML

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0004R, S18B   **Depth:** 54.5-55.8   **Sample Number:** S35534

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr_____   **Checked By:** js_____

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	26	19	7		67.3	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0004R, S20B   **Depth:** 65.2-66.3   **Sample Number:** S35535

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ac/jl   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	33	25	8		55.5	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0004R, S21 **Depth:** 70-70.9 **Sample Number:** S35536

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

PLASTICITY INDEX (y-axis, 0 to 60)

LIQUID LIMIT (x-axis, 0 to 110)

CH or OH

CL or OL

CL-ML

ML or OL

MH-or OH

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	26	22	4		59.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0005R, S05   **Depth:** 9.5-11.0   **Sample Number:** S35537
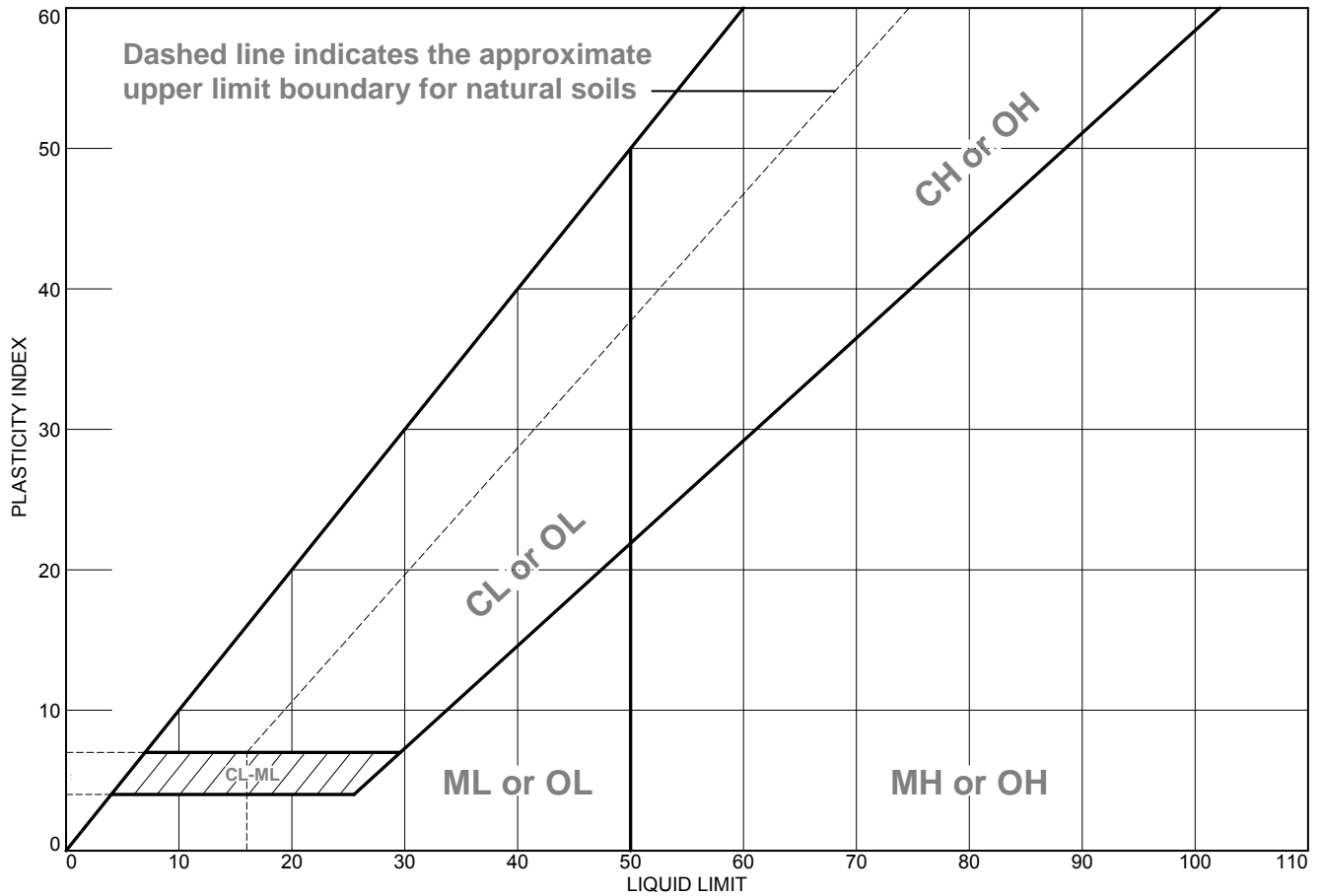
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   Checked By: cw

LIQUID AND PLASTIC LIMITS TEST REPORT
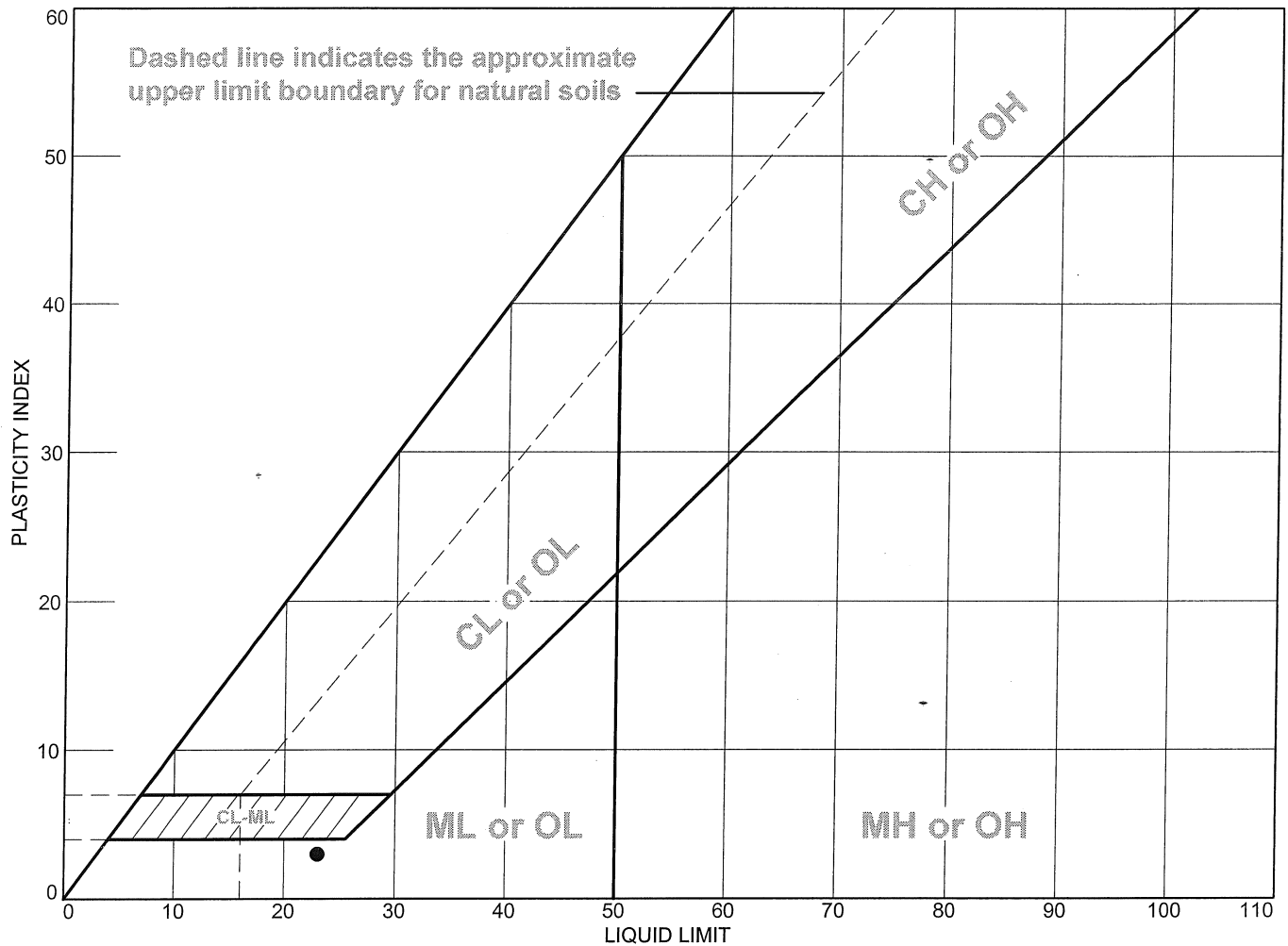
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	23	20	3		57.6	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0005R, S06   **Depth:** 11-12.5   **Sample Number:** S35538

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	23	18	5		67.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0005R, S07   **Depth:** 12.5-13.3   **Sample Number:** S35539

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

Chart: PLASTICITY INDEX (y-axis, 0 to 60) vs LIQUID LIMIT (x-axis, 0 to 110)

Regions labeled: CH or OH, CL or OL, ML or OL, MH or OH, CL-ML

Plotted point at approximately LL=25, PI=7

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	25	18	7		74.4	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

● **Location:** S0005R, S11B   **Depth:** 30.6-31.5   **Sample Number:** S35540

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	33	27	6		59.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

Location: S0005R, S13   **Depth:** 40-41.5   **Sample Number:** S35541

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _stu_   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

Chart: PLASTICITY INDEX (y-axis, 0 to 60) vs LIQUID LIMIT (x-axis, 0 to 110)

Regions labeled: CH or OH, CL or OL, ML or OL, MH or OH, CL-ML

Data point plotted at approximately LL=36, PI=9

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	36	27	9		79.7	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0005R, S14   **Depth:** 45-46.5   **Sample Number:** S35542

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	24	20	4		64.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0005R, S17   **Depth:** 49.5-51.0   **Sample Number:** S35543
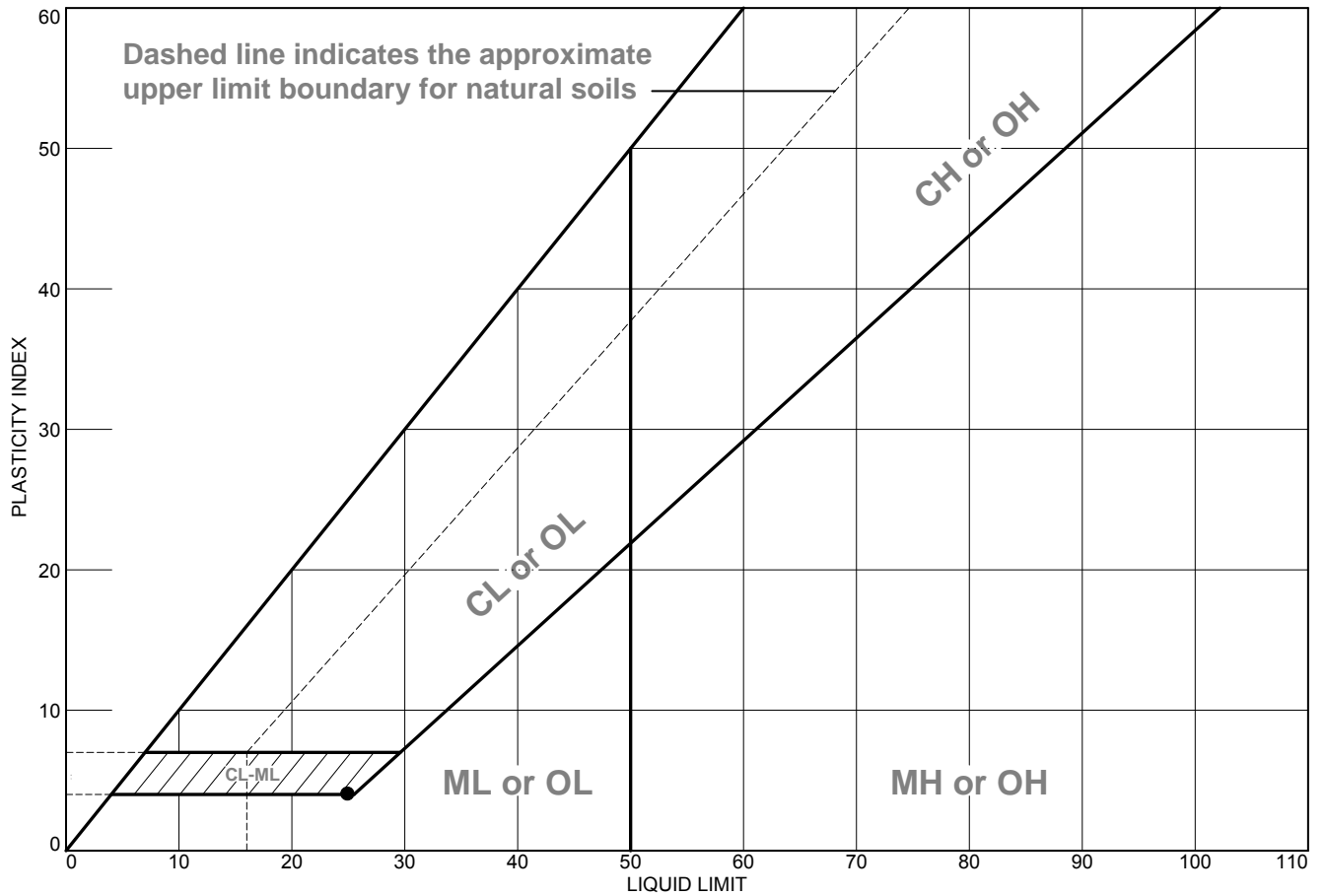
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
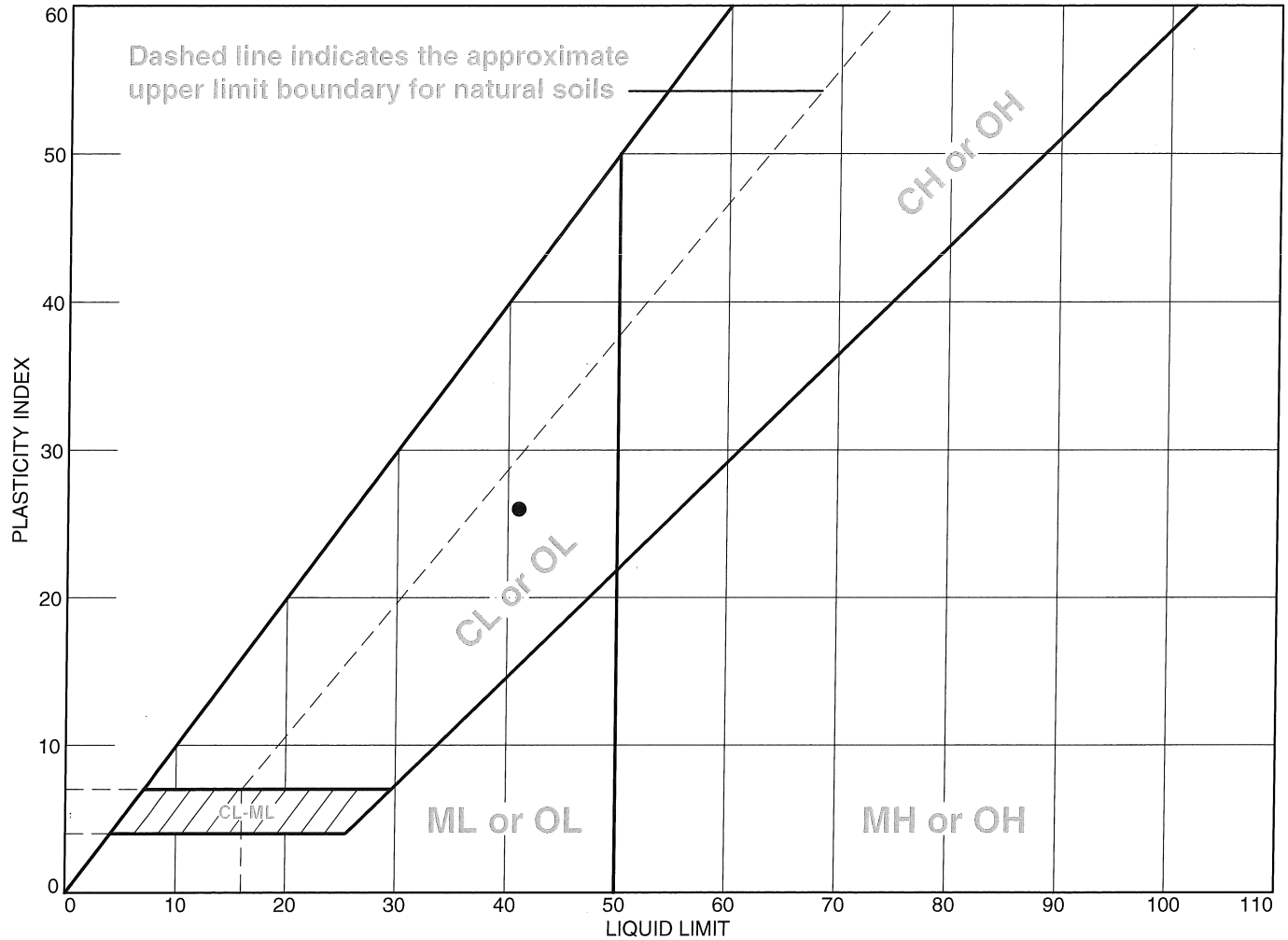
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	41	15	26	93.0	74.8	CL

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0007R, S13B   **Depth:** 40.8-41.1   **Sample Number:** S35560
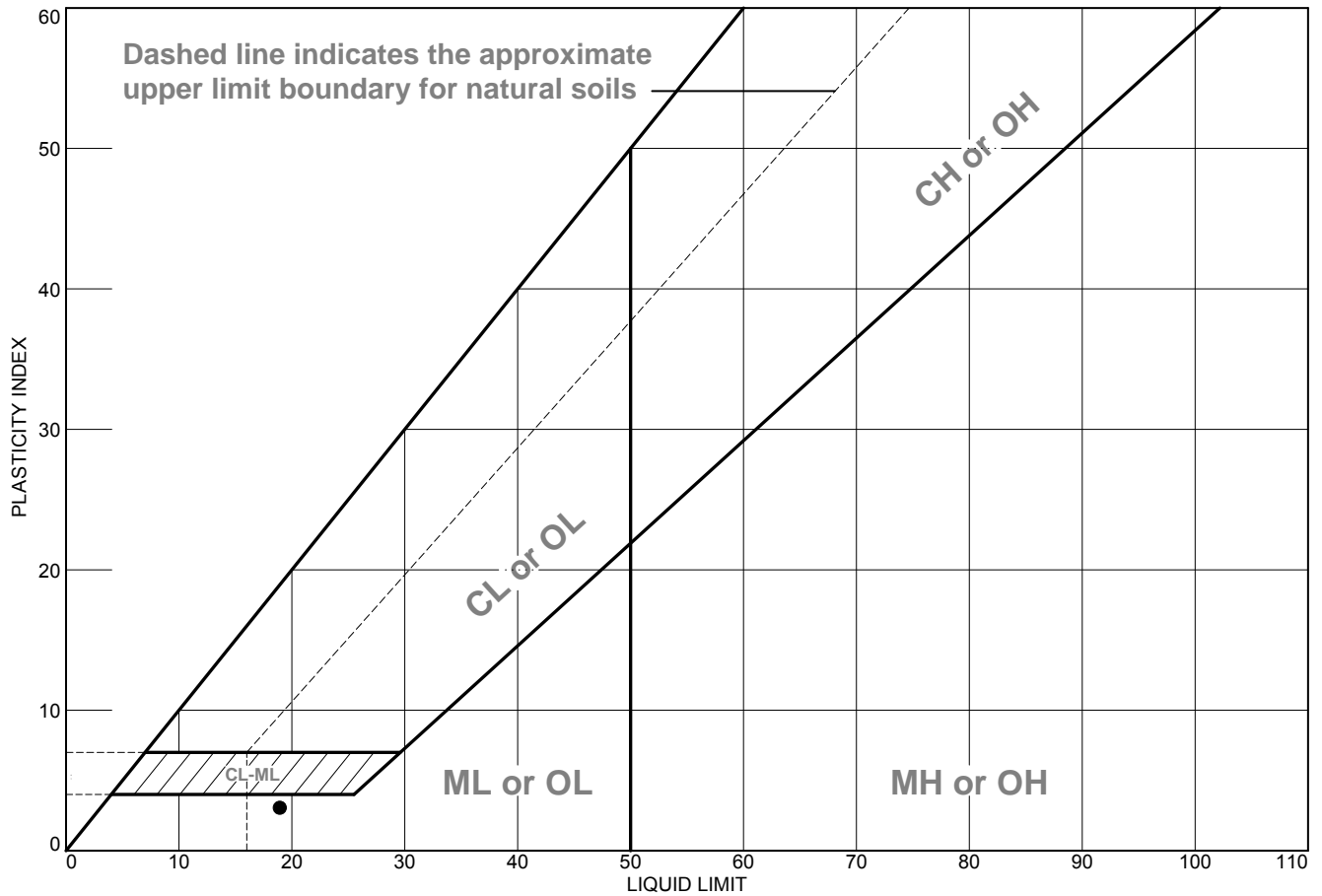
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   Checked By: js

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

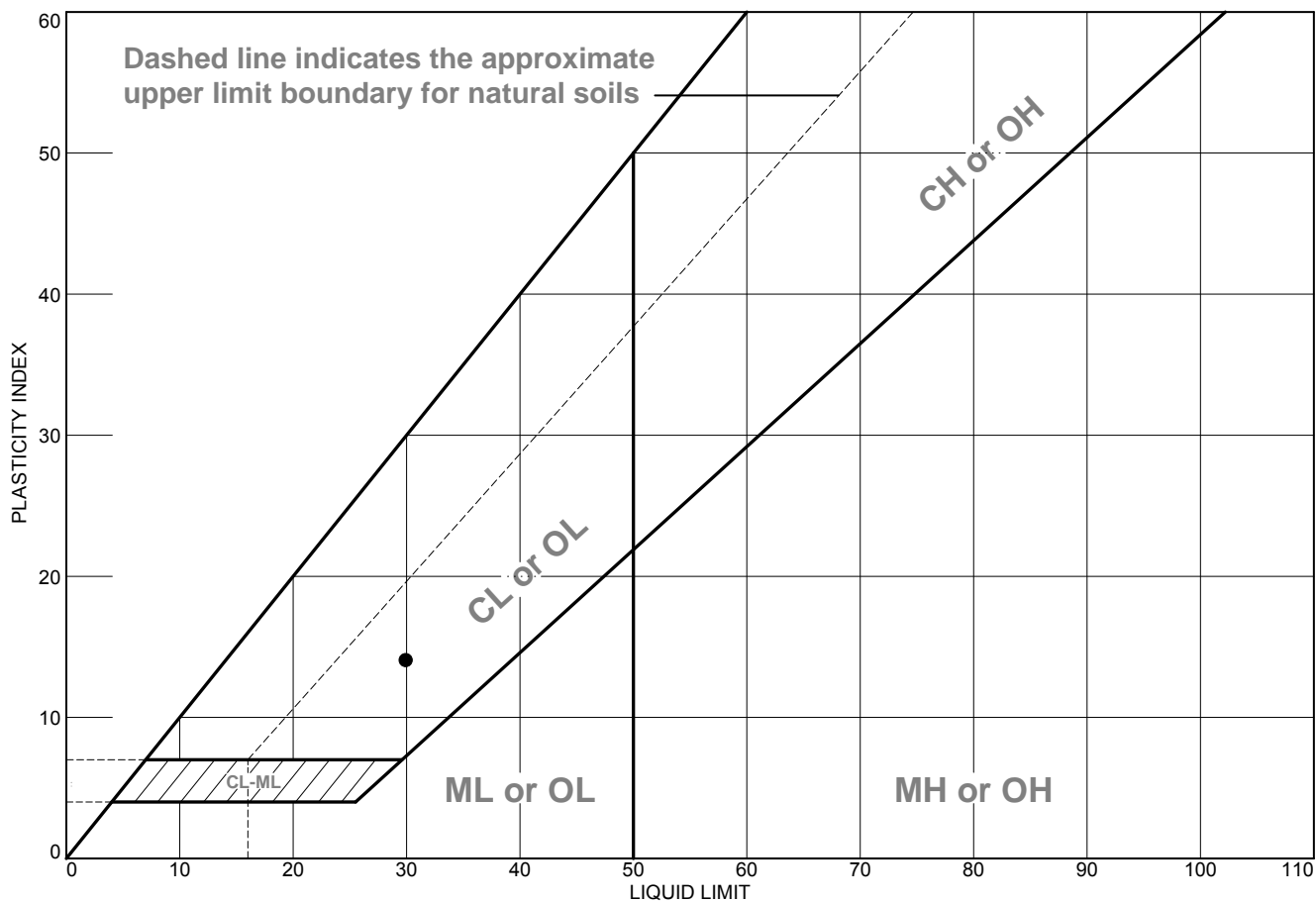| MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	27	22	5		52.9	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0010R, S05   **Depth:** 9.5-10.9   **Sample Number:** S35568

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	29	22	7		58.9	

Project No.   11-111   **Client:**   URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0010R, S07   **Depth:** 12.5-13.2   **Sample Number:** S35570

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

PLASTICITY INDEX (y-axis, 0 to 60)
LIQUID LIMIT (x-axis, 0 to 110)

CH or OH
CL or OL
CL-ML
ML or OL
MH or OH

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
silt	35	25	10	99.1	94.6	ML

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0010R, S10   **Depth:** 25-26.5   **Sample Number:** S35571
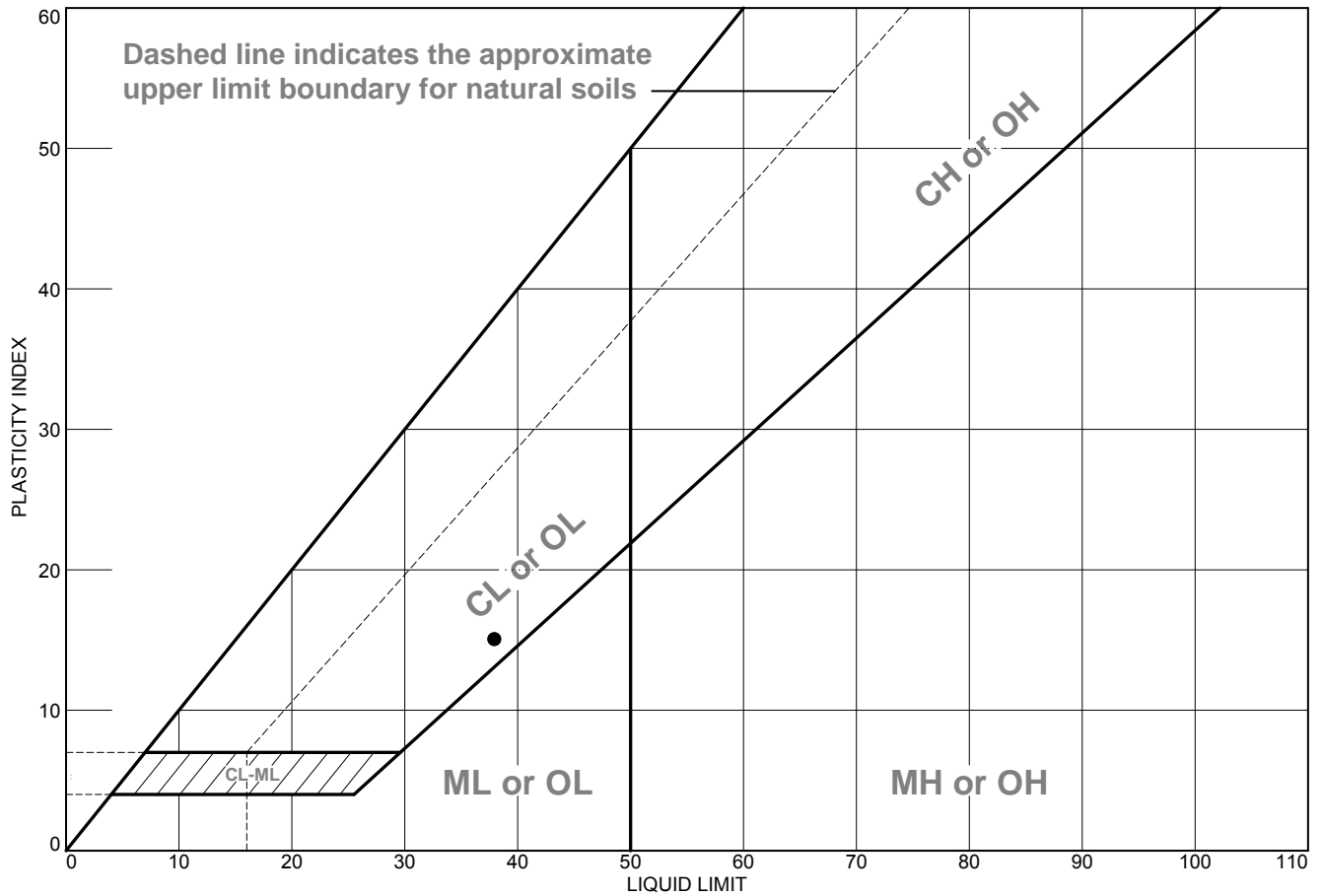
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr   **Checked By:** js

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	24	14	10		50.3	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

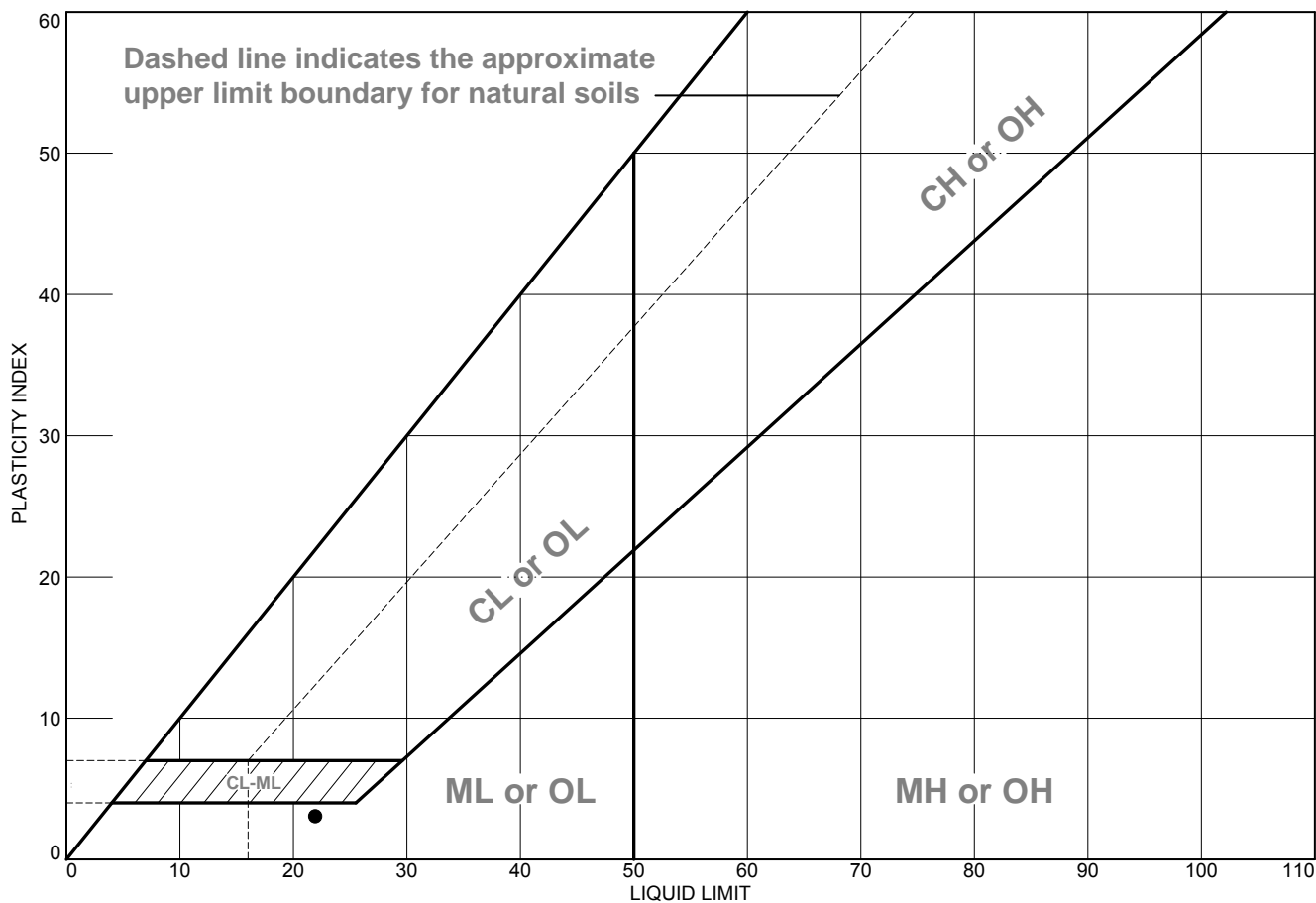● **Location:** S0010R, S14   **Depth:** 45-46.3   **Sample Number:** S35573

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
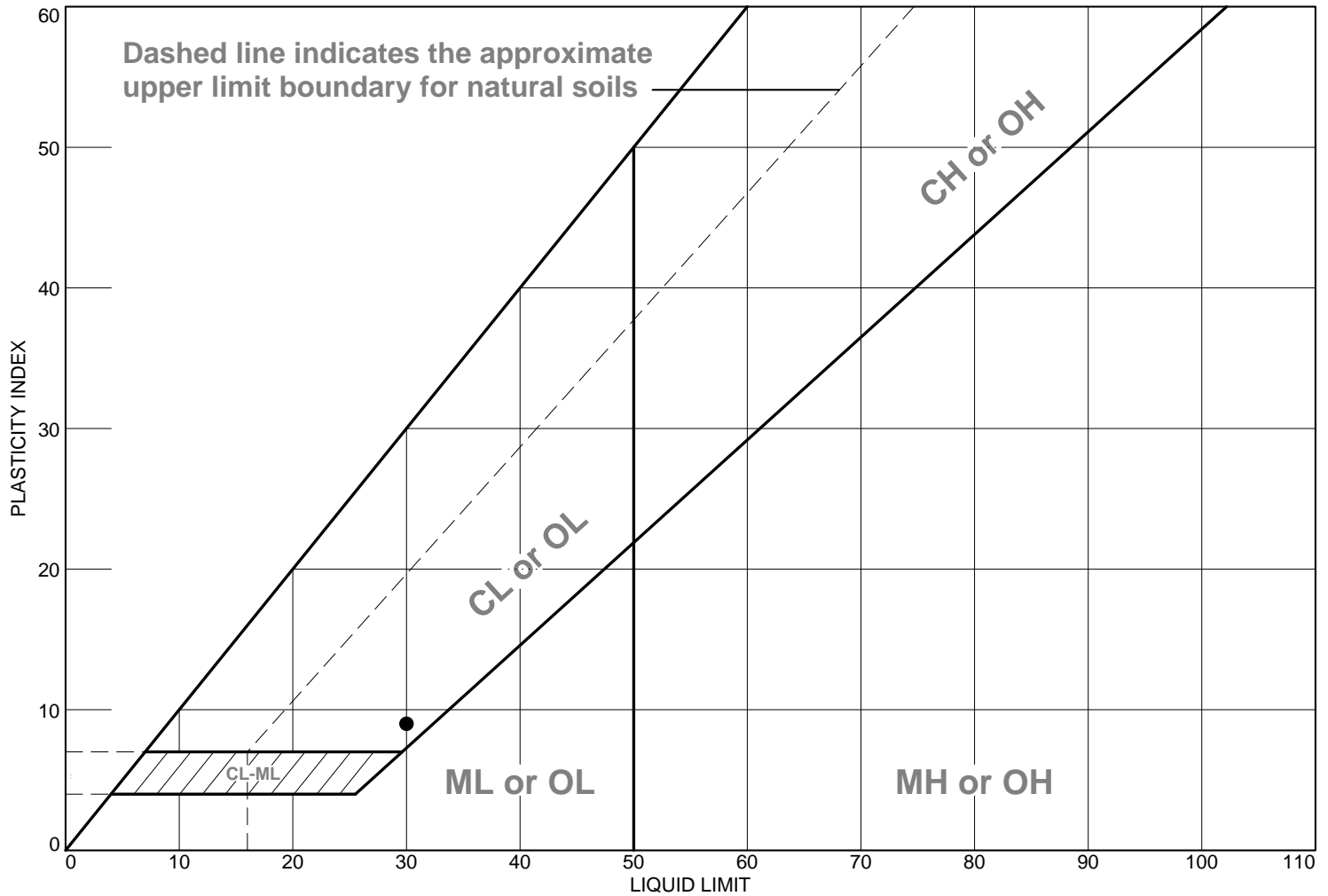
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	30	21	9		75.1	

Project No.   11-111   **Client:**   URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

● **Location:** S0010R, S15   **Depth:** 50-51.3   **Sample Number:** S35574

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT
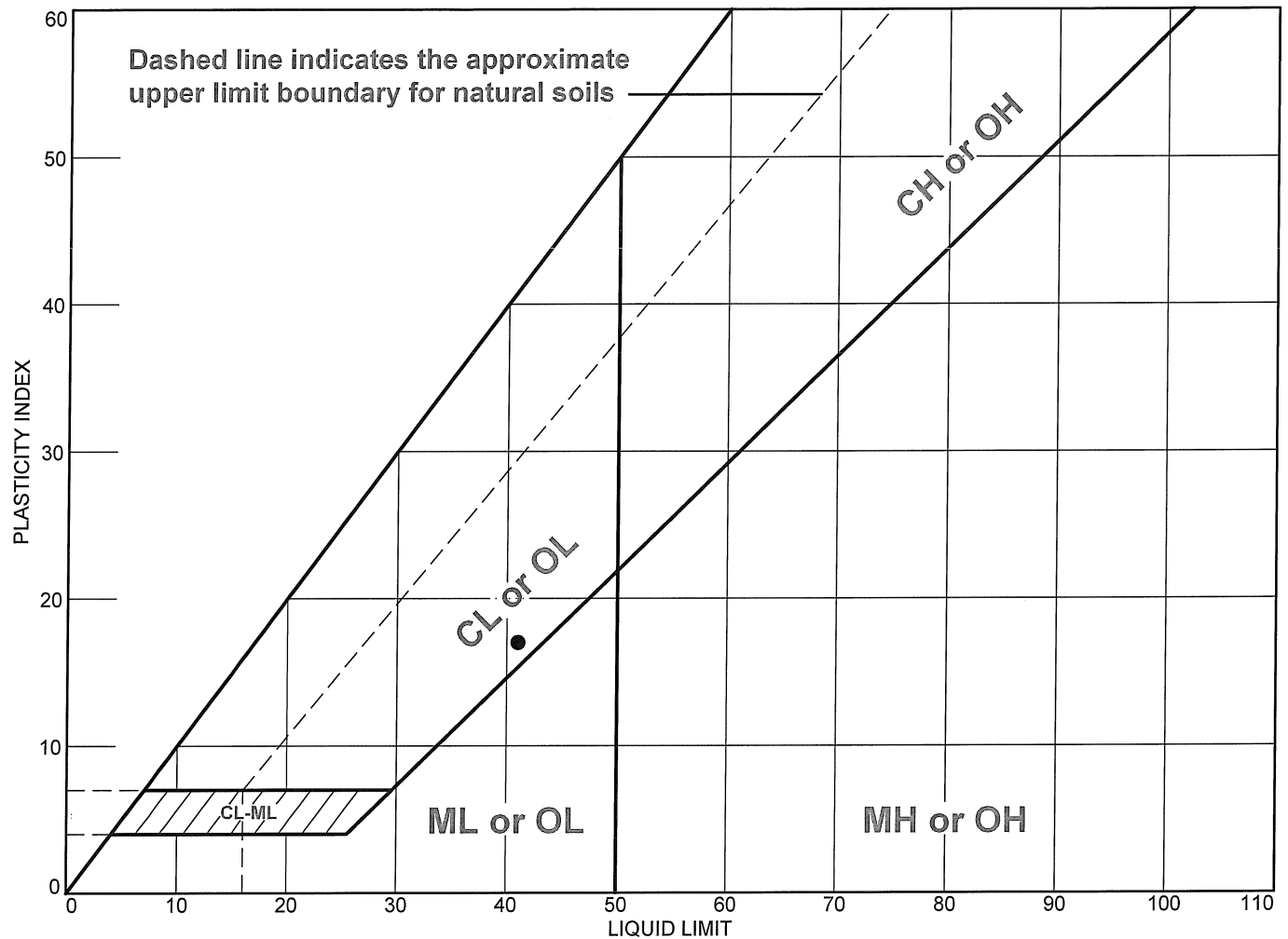
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	41	24	17	92.1	78.3	CL

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0010R, S16   **Depth:** 55-56.5   **Sample Number:** S35575

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** js

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	25	17	8		64.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

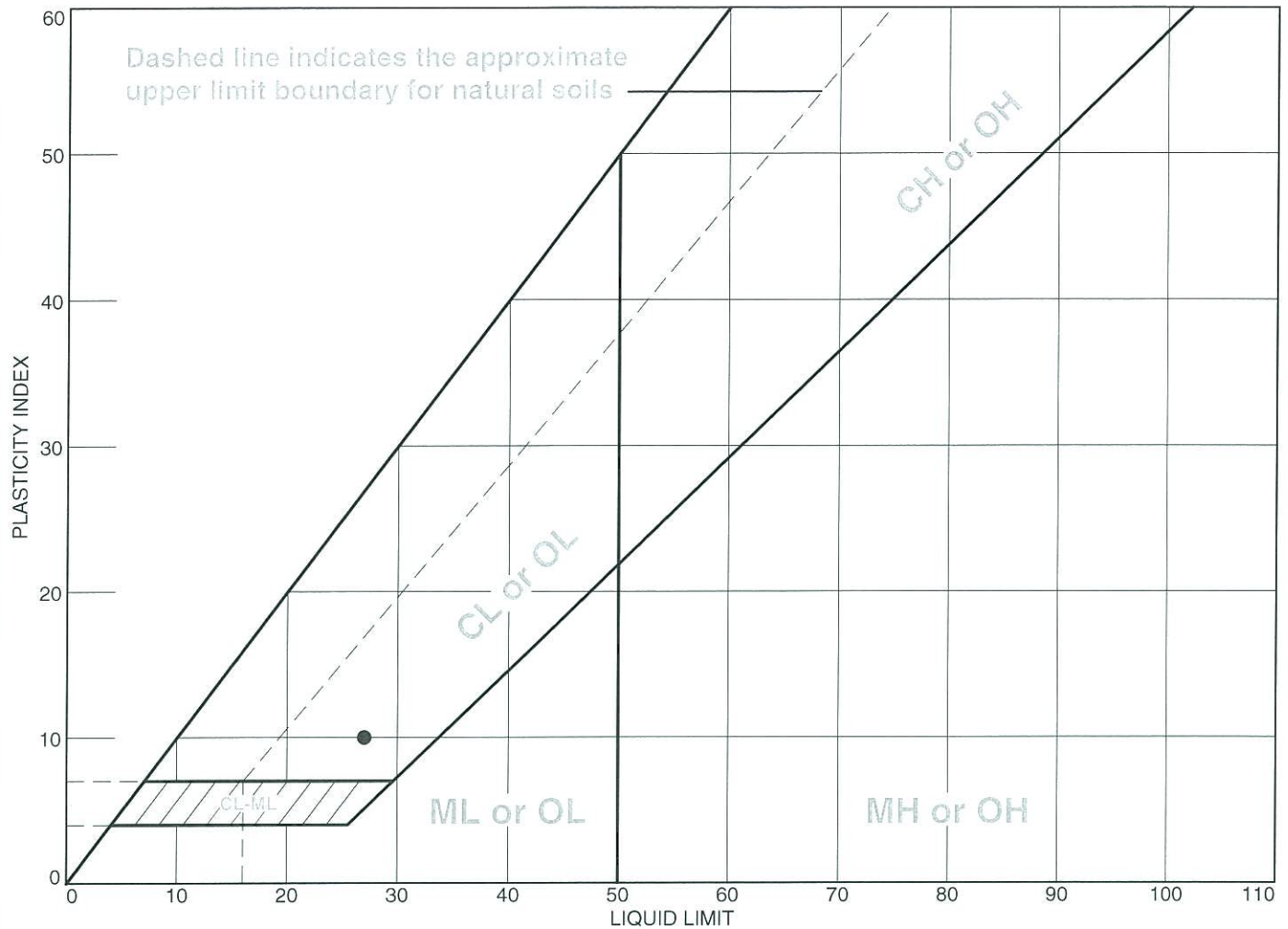**Location:** S0010R, S17   **Depth:** 60-61.3   **Sample Number:** S35576

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

PLASTICITY INDEX (y-axis, 0 to 60)

LIQUID LIMIT (x-axis, 0 to 110)

CH or OH

CL or OL

ML or OL

MH or OH

CL-ML

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	43	17	26		63.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0010R, S18   **Depth:** 65-66.4   **Sample Number:** S35577

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	25	23	2		58.0	

Project No.   11-111   **Client:**   URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

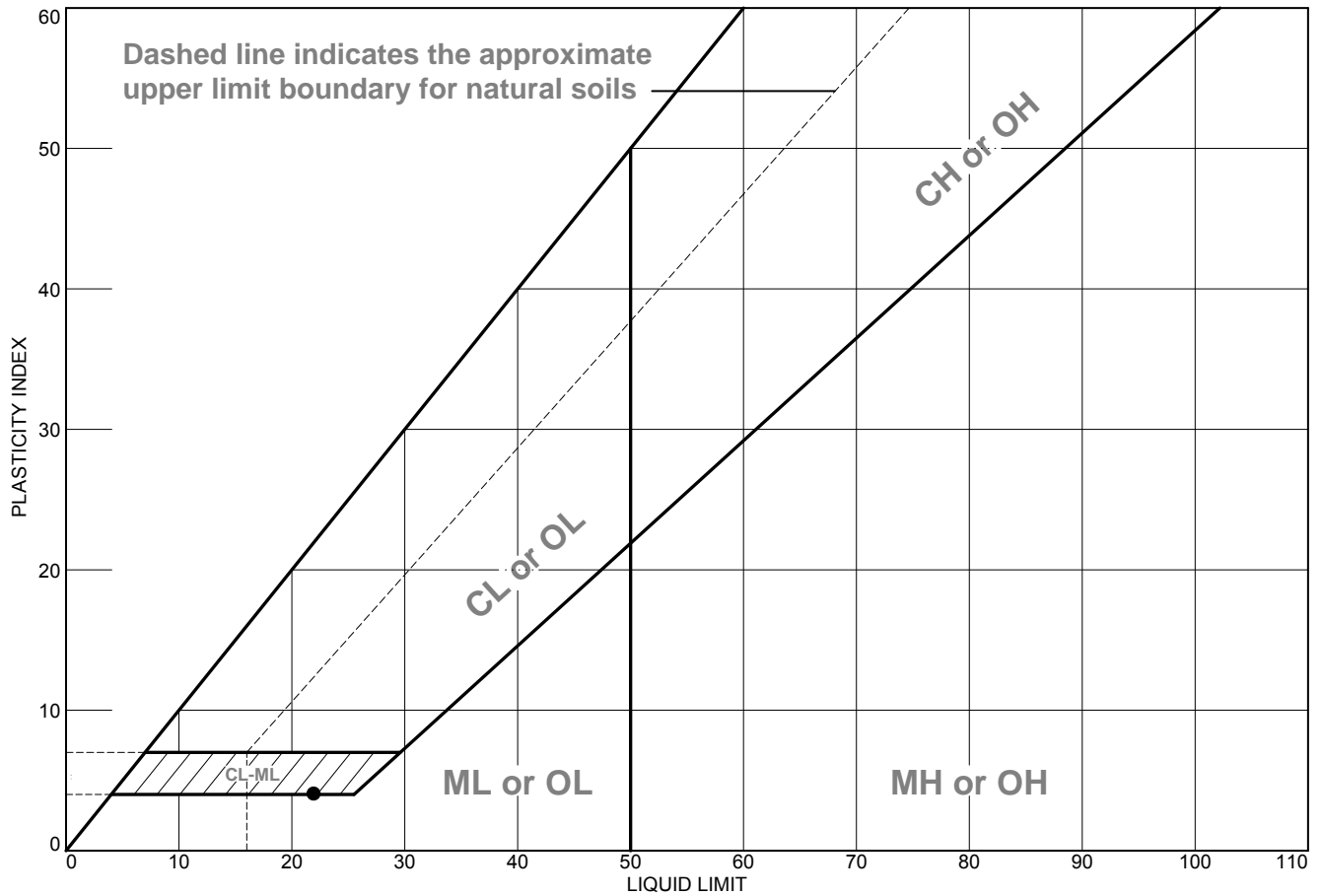● **Location:** S0010R, S21   **Depth:** 80-81.5   **Sample Number:** S35578

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	27	26	1		74.5	

Project No.   11-111   **Client:**   URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

●**Location:** S0010R, S22   **Depth:** 85-86.4   **Sample Number:** S35579

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _stu_   **Checked By:** cw
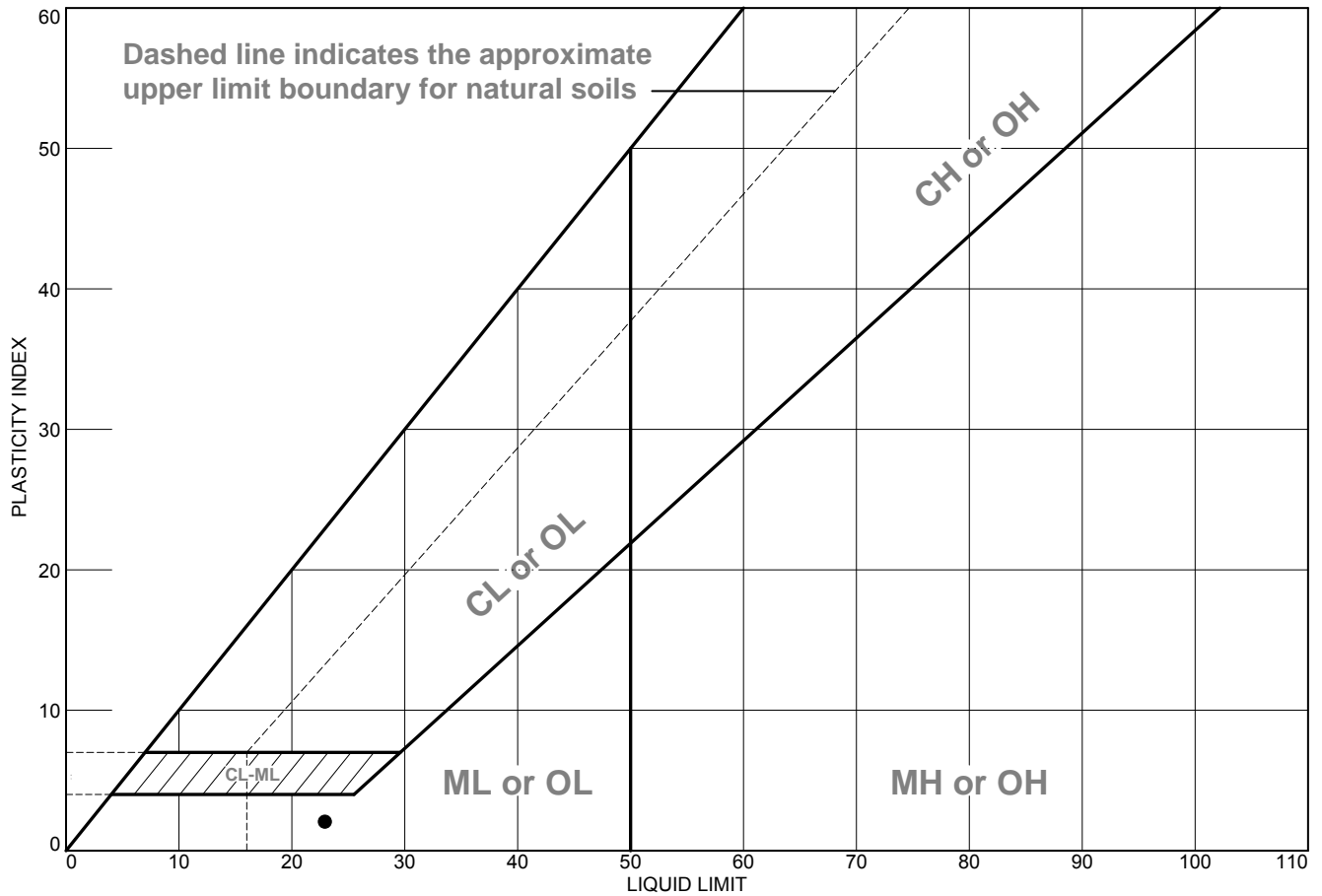
LIQUID AND PLASTIC LIMITS TEST REPORT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	44	32	12		70.0	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

● **Location:** S0010R, S30   **Depth:** 125-126.2   **Sample Number:** S35584

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr   **Checked By:** js

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	40	30	10	95.3	86.5	ML

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0012R, S33   **Depth:** 140-141.4   **Sample Number:** S35608

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/rh   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	27	17	10		59.1	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014AR, S05   **Depth:** 9.5-11.0   **Sample Number:** S35642

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jm   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

PLASTICITY INDEX

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	65	16	49	90.1	58.9	CH

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014AR, S07   **Depth:** 12.5-13.8   **Sample Number:** S35644

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: PR   **Checked By:** CW

LIQUID AND PLASTIC LIMITS TEST REPORT
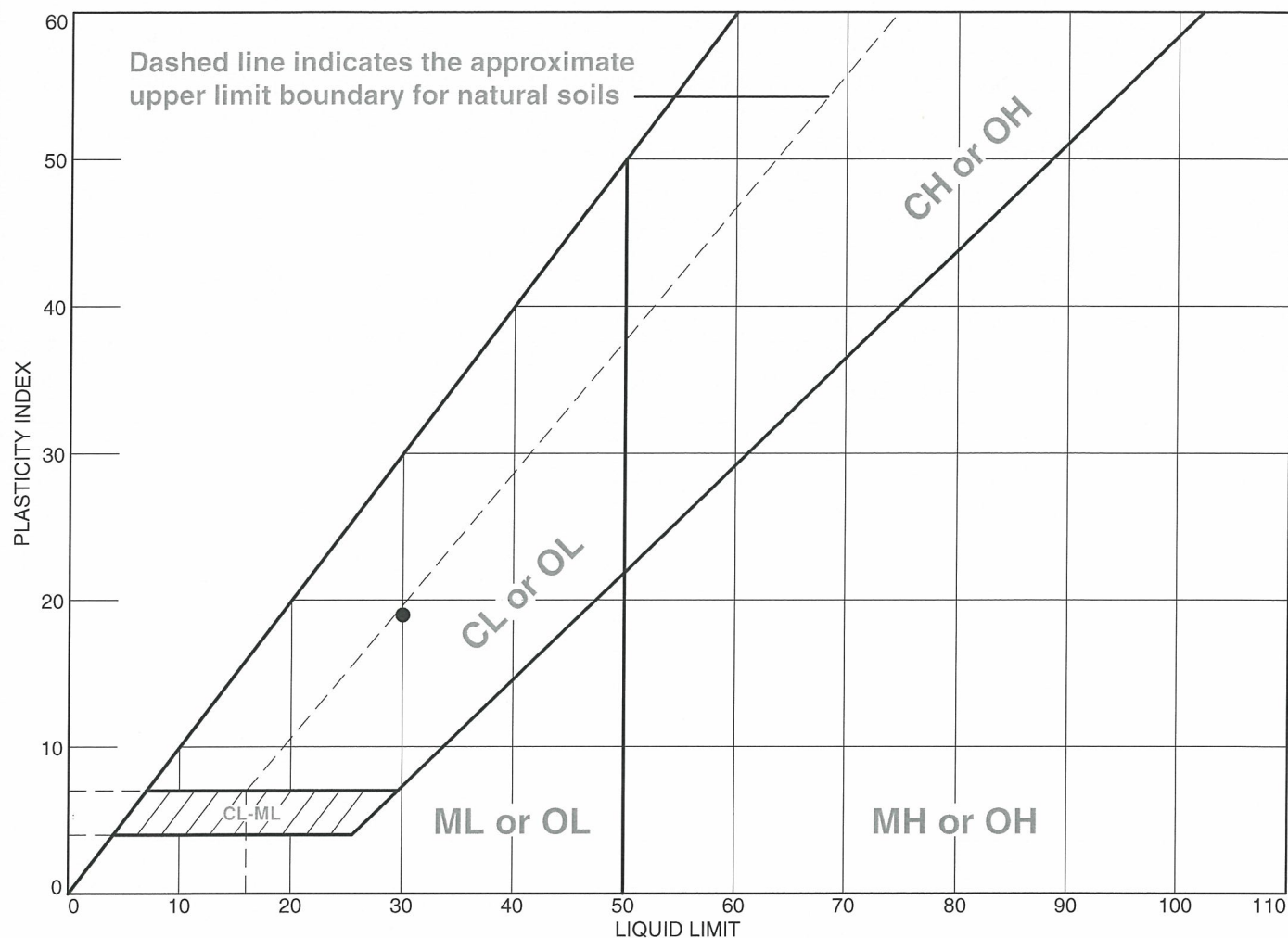
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	30	11	19		60.8	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0014AR, S13   **Depth:** 40-41.4   **Sample Number:** S35648

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: JL   **Checked By:** CW

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

PLASTICITY INDEX

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

LIQUID LIMIT
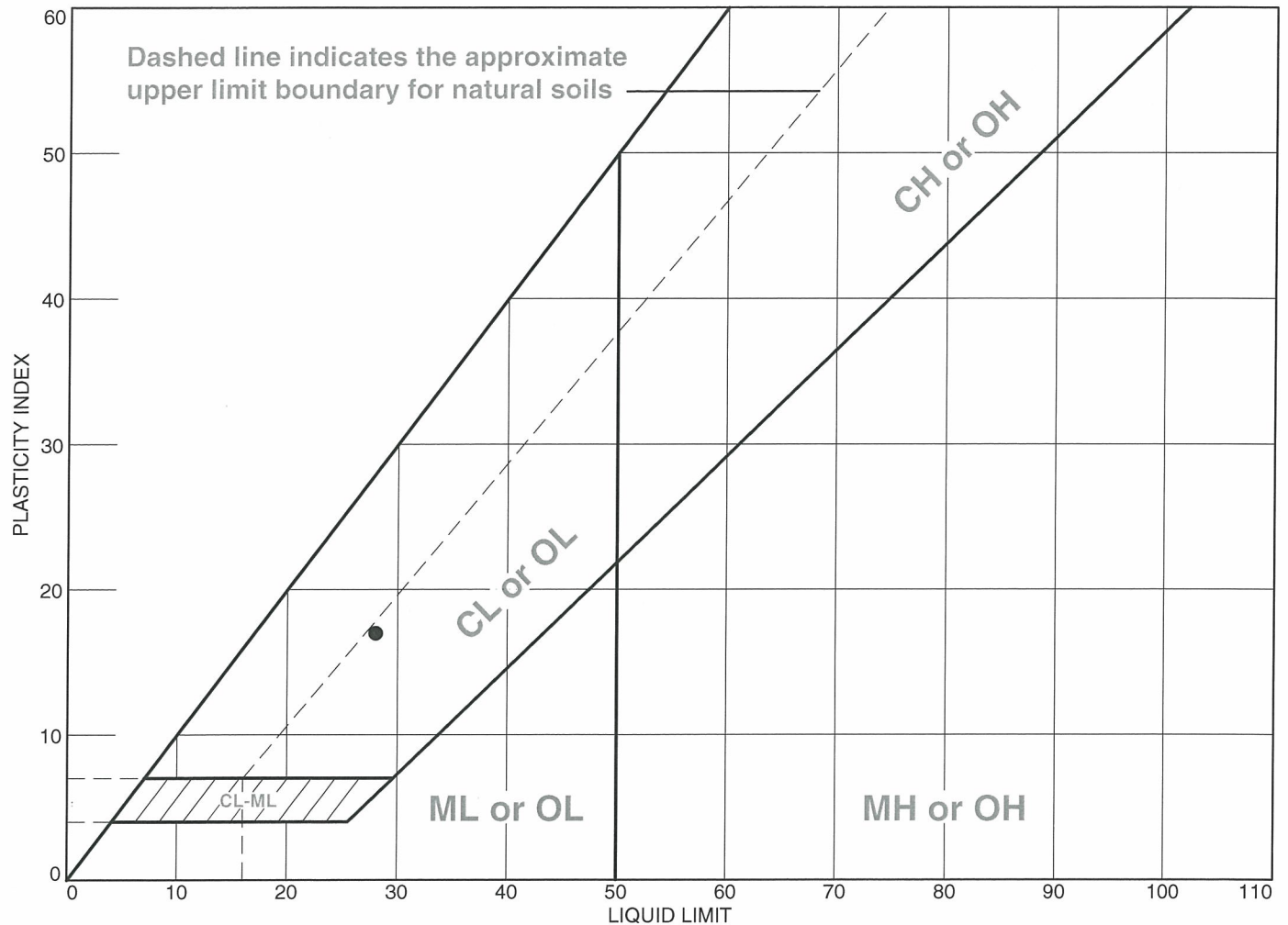
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	28	11	17	91.6	55.2	CL

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0014AR, S14   **Depth:** 45-46.5   **Sample Number:** S35649

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: JL   **Checked By:** CW

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT
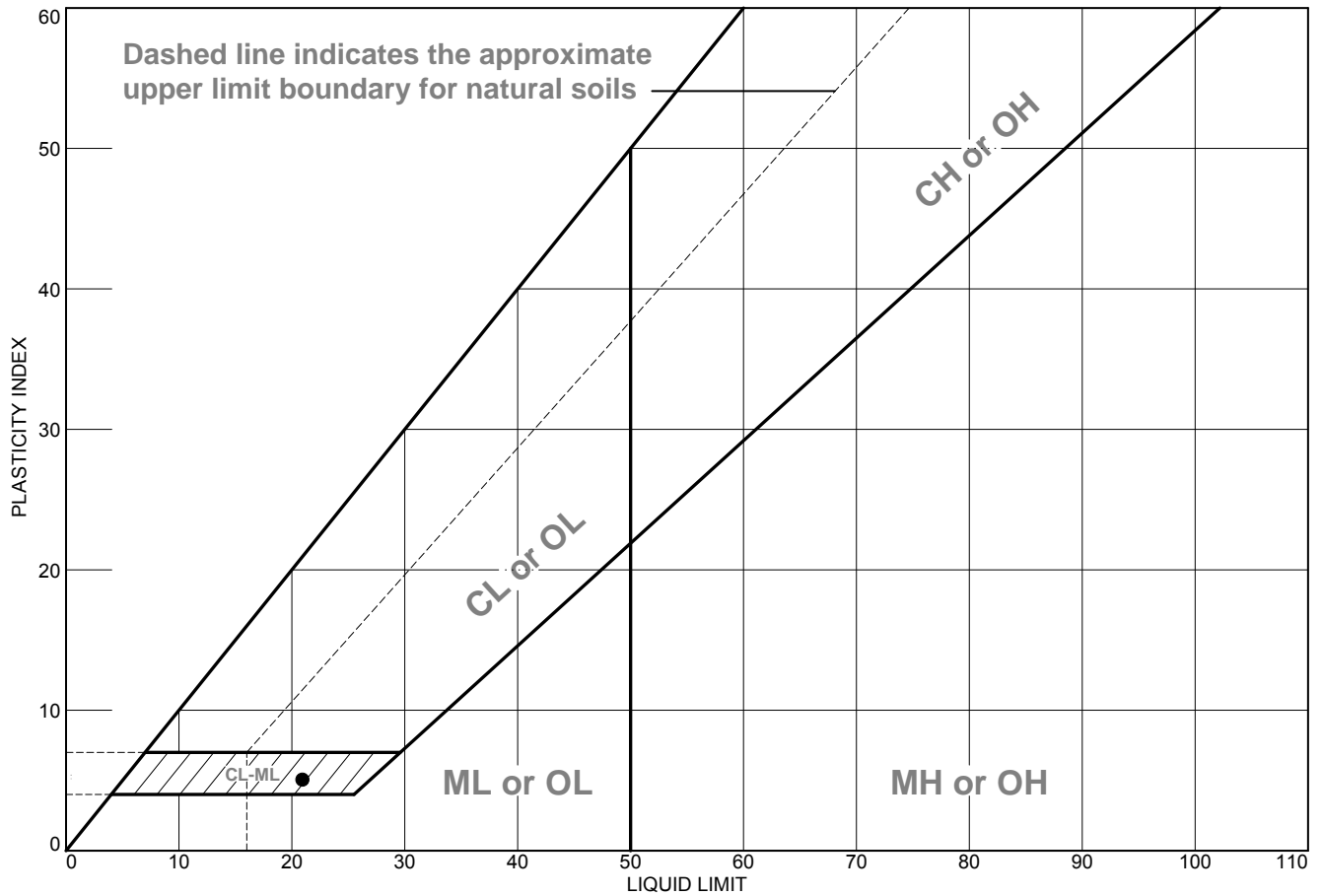
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	21	16	5		53.9	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014R, S04 **Depth:** 8-9.3 **Sample Number:** S35628

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	28	16	12		70.6	

Project No. 11-111   **Client:** URS / HMM/ ARUP   **Remarks:**

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014R, S06   **Depth:** 11-12.2   **Sample Number:** S35630

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jm   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	NP	NP	NP	98.5	43.9	SM

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014R, S10   **Depth:** 25-26.4   **Sample Number:** S35633

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT
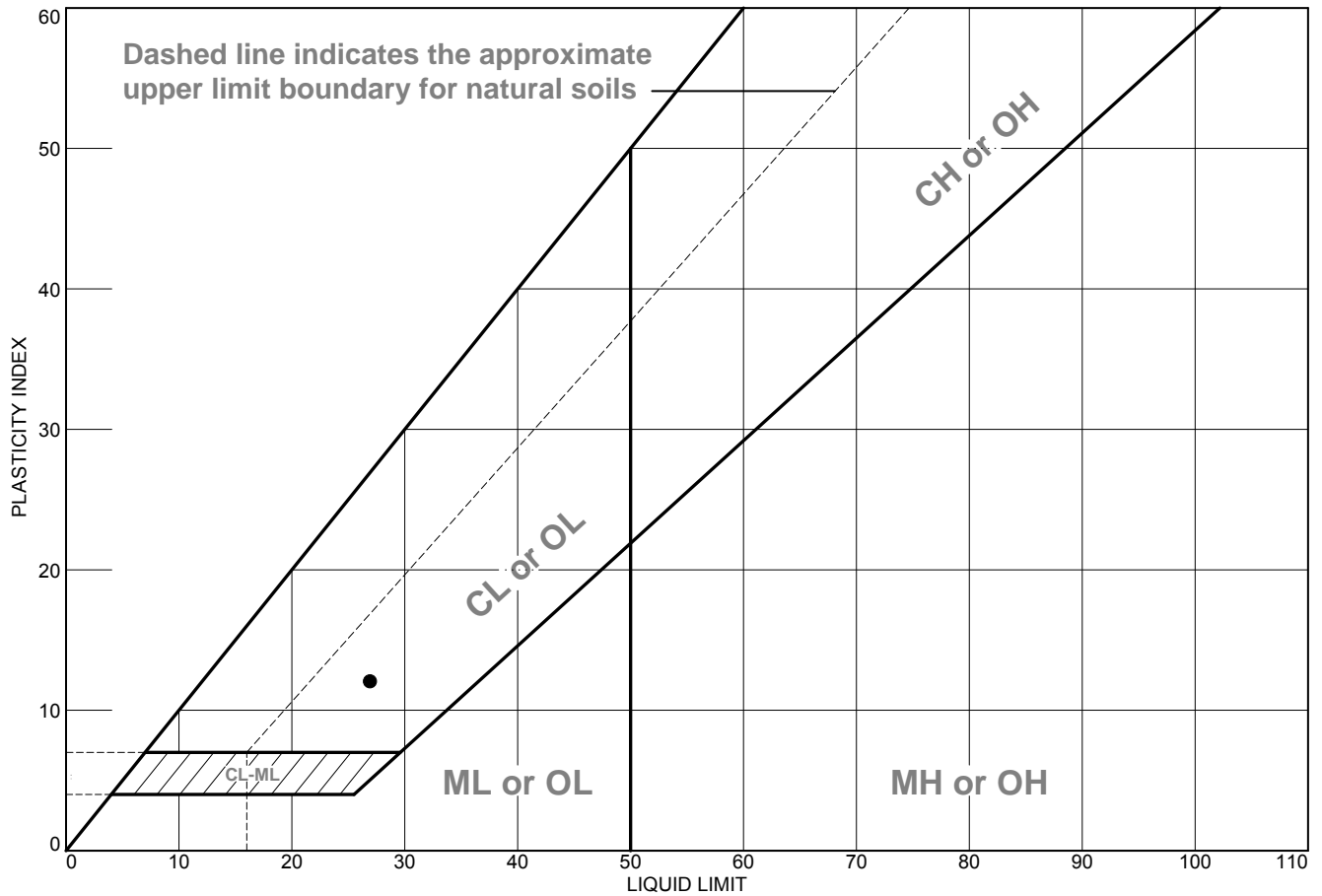
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	27	15	12		60.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014R, S12   **Depth:** 35-36.5   **Sample Number:** S35634

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jm   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

(Plasticity chart with axes PLASTICITY INDEX (0–60) vs LIQUID LIMIT (0–110), zones labeled CH or OH, CL or OL, ML or OL, MH or OH, CL-ML)
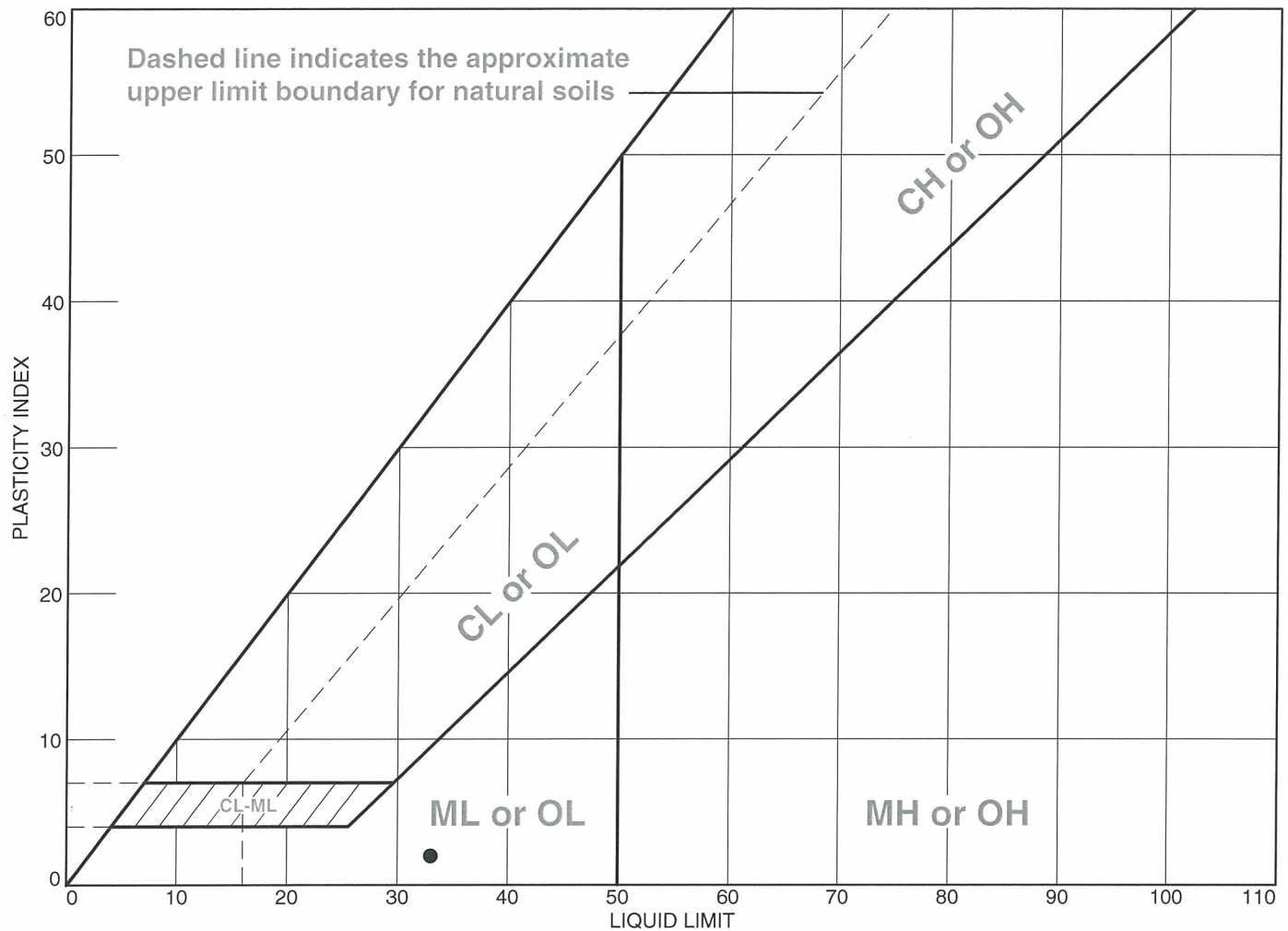
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	33	31	2	77.4	59.5	ML

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

Location: S0014R, S15   **Depth:** 50-51.5   **Sample Number:** S35636

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: AC/RH   **Checked By:** CW

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX (y-axis, 0 to 60)

LIQUID LIMIT (x-axis, 0 to 110)
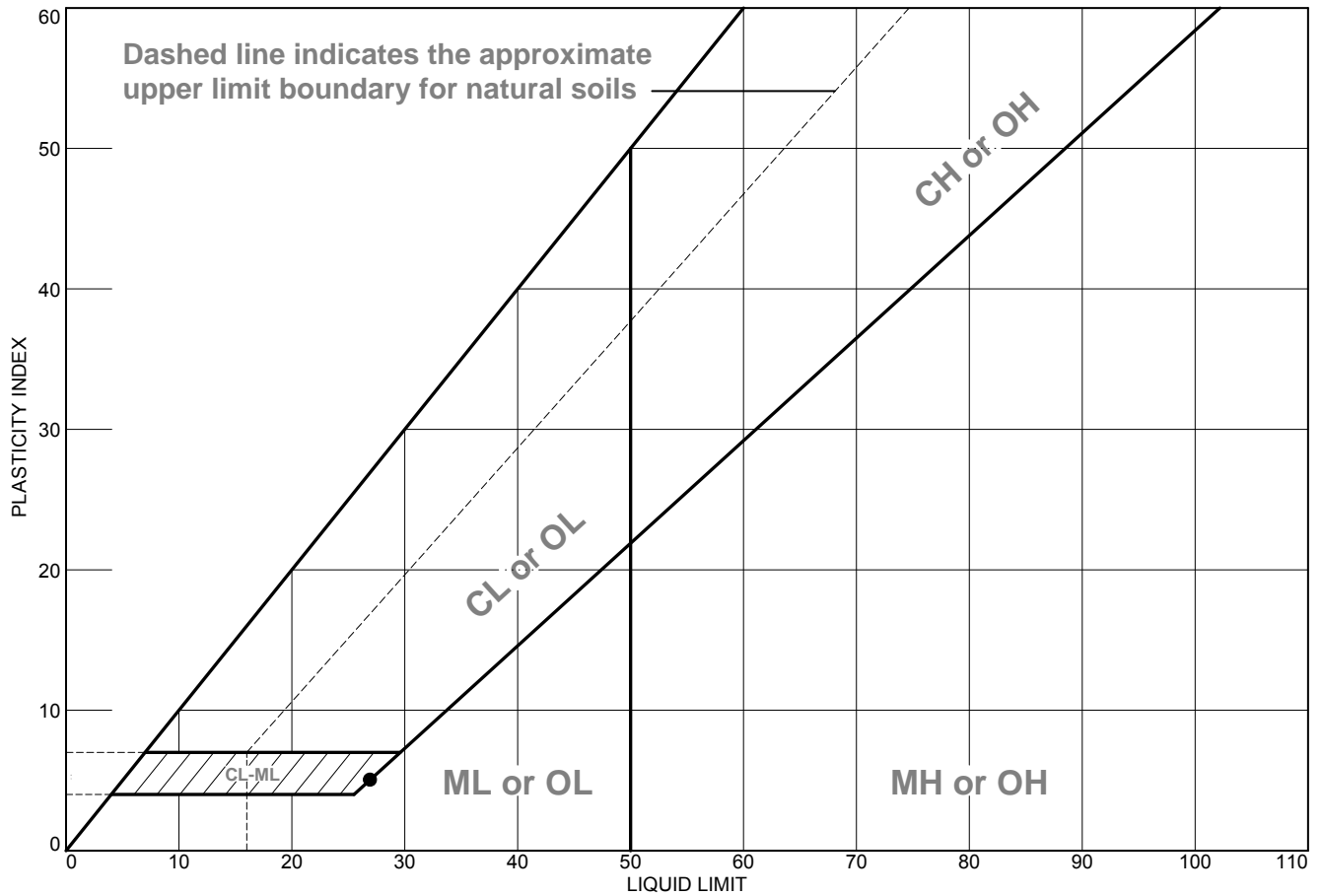
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	27	22	5		75.1	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0014R, S16   **Depth:** 55-56.4   **Sample Number:** S35637

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	24	20	4		72.5	

Project No.   11-111   **Client:**   URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

●**Location:** S0015R, S07B   **Depth:** 12.9-13.8   **Sample Number:** S35658

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _stu_   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	23	18	5		75.7	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0015R, S08 **Depth:** 14-15.5 **Sample Number:** S35659

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jm **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	25	21	4		91.9	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0015R, S15A   **Depth:** 50-50.6   **Sample Number:** S35663

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jm   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

Chart: Plasticity Index (y-axis, 0 to 60) vs Liquid Limit (x-axis, 0 to 110)

Regions labeled: CH or OH, CL or OL, CL-ML, ML or OL, MH or OH

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	19	16	3		62.5	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0016R, S02   **Depth:** 5-6.0   **Sample Number:** S36293

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	30	16	14		73.3	

Project No.   11-111   **Client:**   URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

●**Location:** S0016R, S11B   **Depth:** 50.8-51.5   **Sample Number:** S35670

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jm   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT
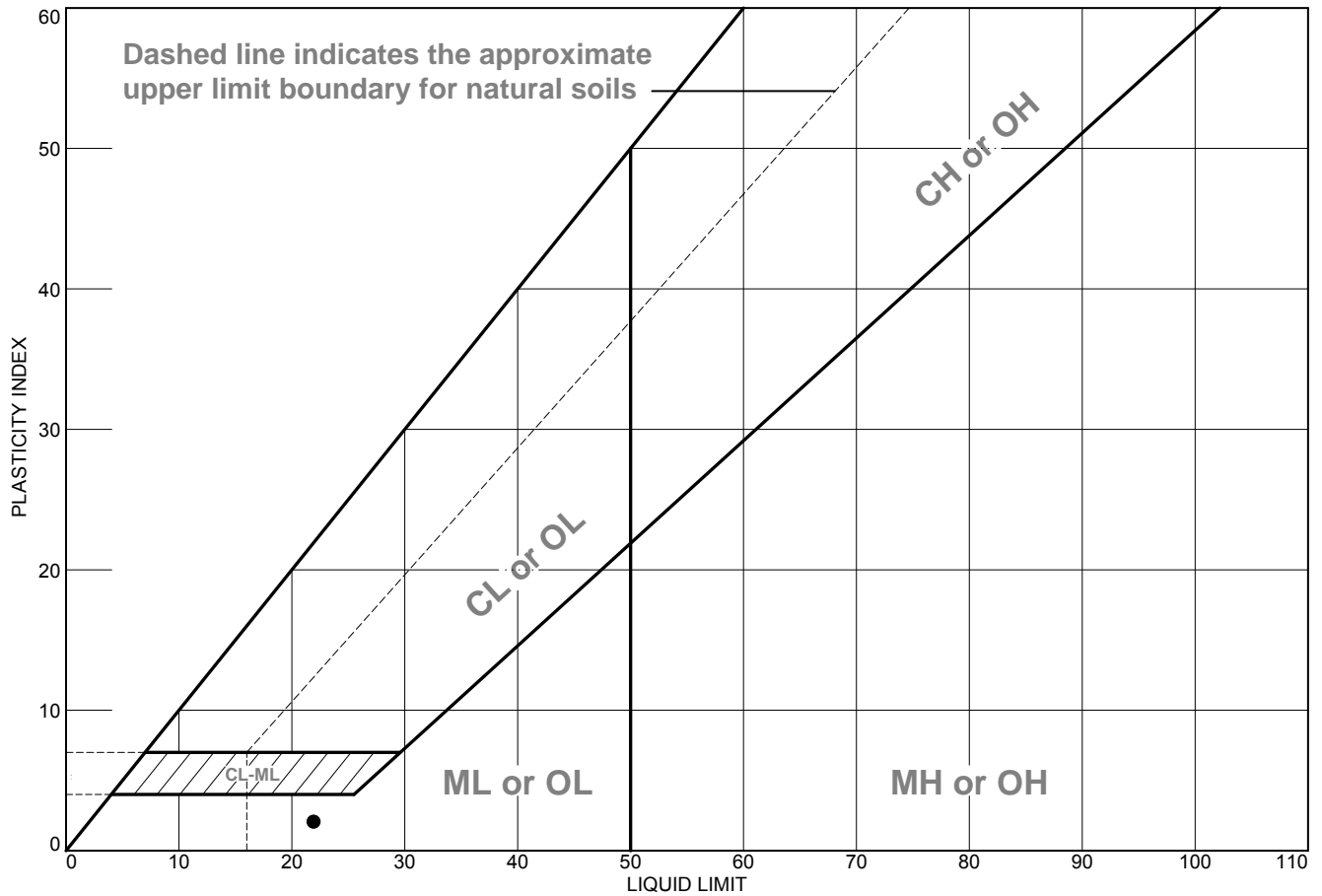
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	22	20	2		64.4	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0016R, S16   **Depth:** 75-76.2   **Sample Number:** S35673

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _stu_   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	38	23	15		88.0	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0016R, S25   **Depth:** 120-121.5   **Sample Number:** S36301

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	21	17	4		72.1	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0017R, S05   **Depth:** 20-21.2   **Sample Number:** S35685

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr

Checked By: cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		22	19	3		62.4	

Project No.   11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

●**Location:** S0017R, S09   **Depth:** 40-40.7   **Sample Number:** S35686

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: PR   **Checked By:** CW

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

Chart: PLASTICITY INDEX (y-axis, 0 to 60) vs LIQUID LIMIT (x-axis, 0 to 110)

Regions labeled: CH or OH, CL or OL, CL-ML, ML or OL, MH or OH

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	27	23	4		85.1	

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●Location: S0017R, S17A   **Depth:** 80-80.3   **Sample Number:** S35690

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: PR   **Checked By:** CW

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

ML or OL

MH or OH

CL-ML

PLASTICITY INDEX

LIQUID LIMIT

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		27	17	10	96.0	76.4	CL

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

● **Location:** S0017R, S25   **Depth:** 120-121.2   **Sample Number:** S35696

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr/ac   **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

PLASTICITY INDEX

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	40	26	14		70.9	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0017R, S29A **Depth:** 140-140.5 **Sample Number:** S35697

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

Chart labels: CH or OH, CL or OL, CL-ML, ML or OL, MH or OH

Y-axis: PLASTICITY INDEX (0 to 60)
X-axis: LIQUID LIMIT (0 to 110)

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	22	18	4		76.9	

Project No. 11-111   **Client:** URS / HMM/ ARUP   **Remarks:**

Project: CA High Speed Train

 Fresno to Bakersfield Geotech Investigation

●**Location:** S0018R, S06   **Depth:** 25-26.2   **Sample Number:** S36317

SIERRA TESTING LABS, INC.

El Dorado Hills, CA   **Figure**

Tested By: jm_____   **Checked By:** cw_____

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	23	21	2		64.4	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

●**Location:** S0019R, S02B **Depth:** 5.8-6.5 **Sample Number:** S35720

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** cw

LIQUID AND PLASTIC LIMITS TEST REPORT

Dashed line indicates the approximate
upper limit boundary for natural soils

CH or OH

CL or OL

CL-ML

ML or OL

MH or OH

PLASTICITY INDEX

LIQUID LIMIT

MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	23	20	3		88.1	

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
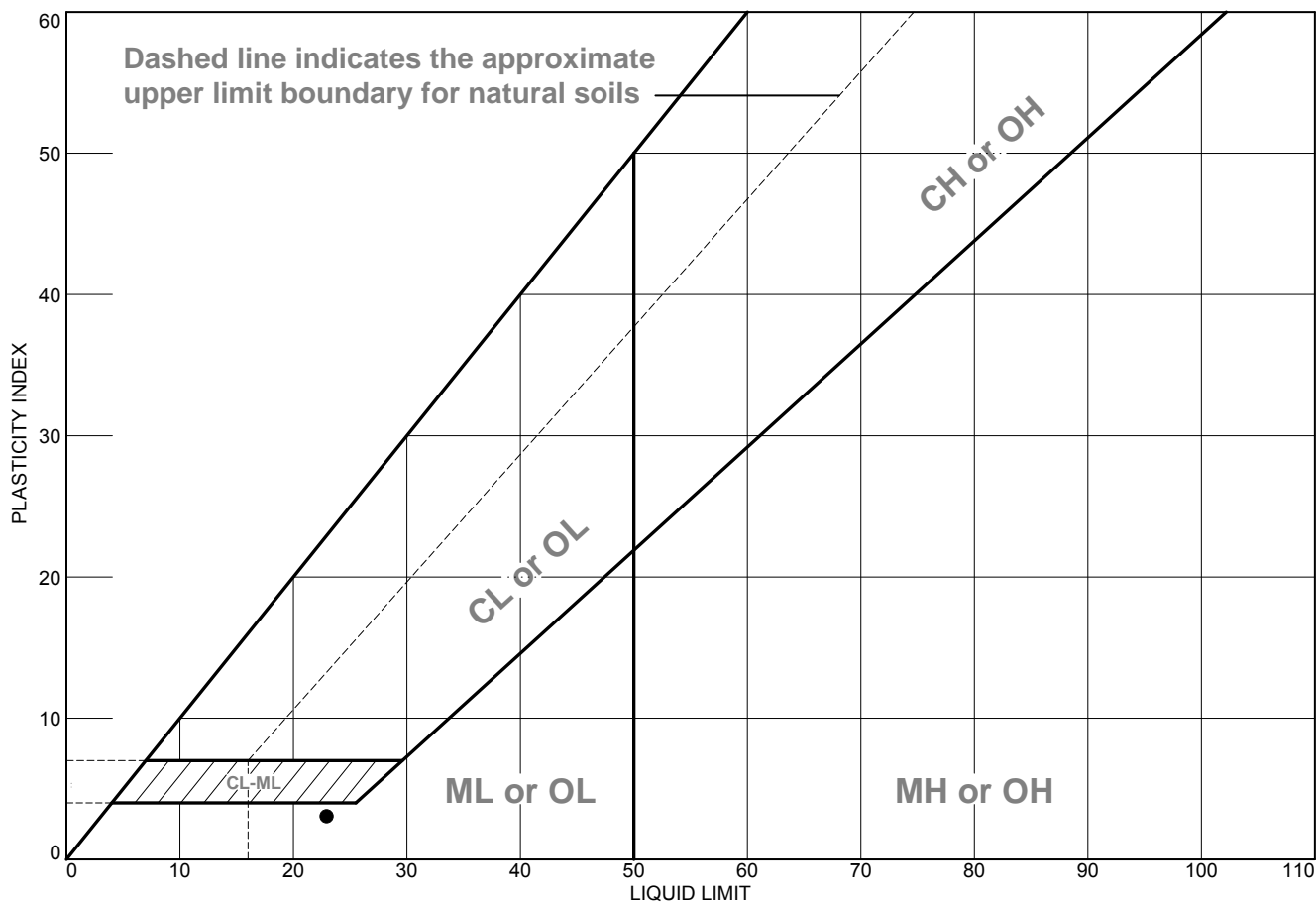
Fresno to Bakersfield Geotech Investigation

●Location: S0019R, S04B **Depth:** 9-10.0 **Sample Number:** S36328

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: _pr_ **Checked By:** cw

PARTICLE SIZE ANALYSIS AND #200 SIEVE WASH

Particle Size Distribution Report
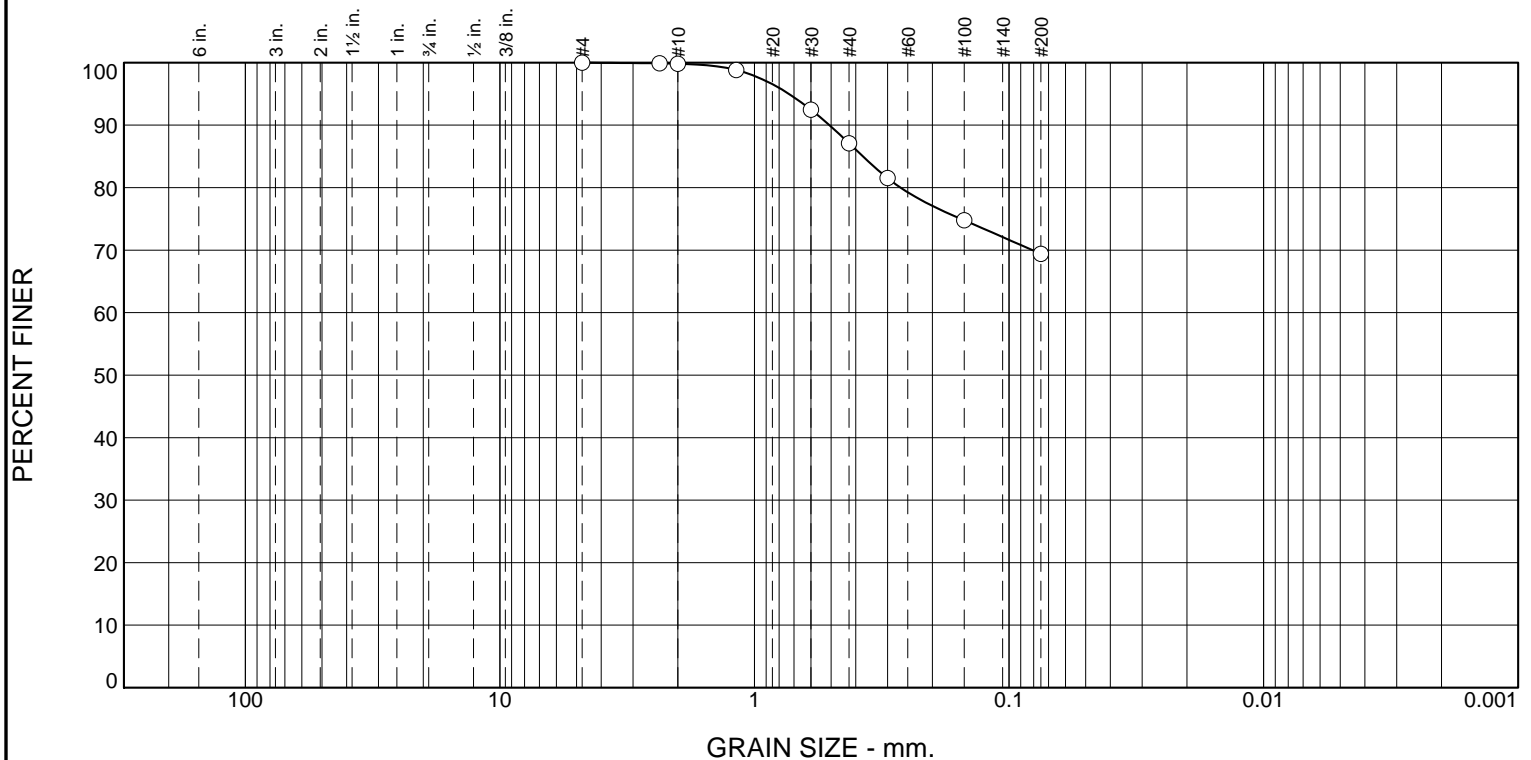
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	12.7	17.7	69.4	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.8		
#16	98.8		
#30	92.5		
#40	87.1		
#50	81.5		
#100	74.8		
#200	69.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.5081 D_{85}= 0.3750 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ts

Checked By: cw

Title: PM

Location: S0001R, S06B
Sample Number: S36225   **Depth:** 11-11.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
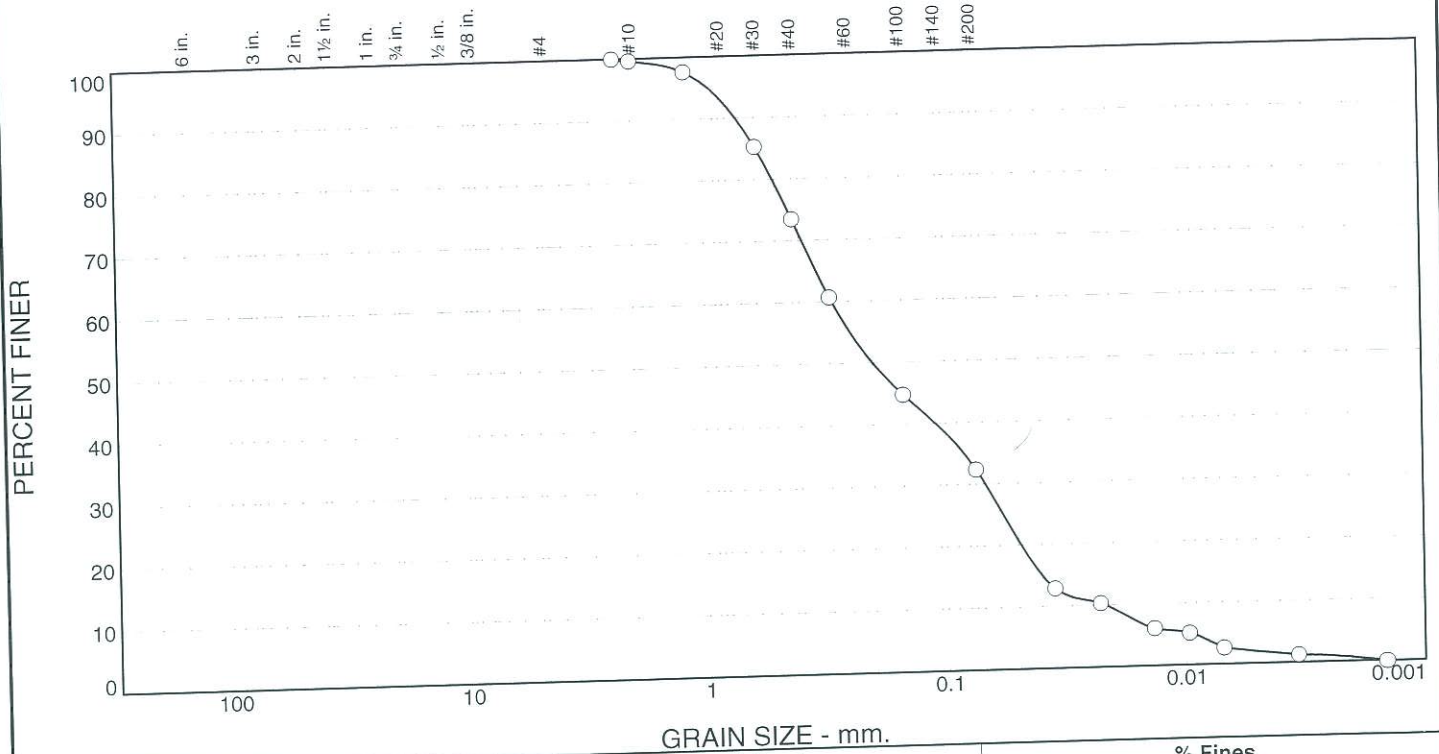
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	26.1	41.1	30.5	1.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	99.6		
#16	97.6		
#30	85.3		
#40	73.5		
#50	60.7		
#100	44.8		
#200	32.4		
0.0354 mm.	12.9		
0.0228 mm.	10.3		
0.0136 mm.	6.0		
0.0097 mm.	5.2		
0.0069 mm.	2.6		
0.0034 mm.	1.2		
0.0014 mm.			

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7179 D_{85}= 0.5941 D_{60}= 0.2933
D_{50}= 0.1997 D_{30}= 0.0686 D_{15}= 0.0401
D_{10}= 0.0218 C_u= 13.42 C_c= 0.74

Remarks

Date Received: 11/1/11   Date Tested: 1/24/12

Tested By: mpw/jm

Checked By: cw

Title: PM

Date Sampled:

Location: S0001R, S07   Depth: 12.5-14.0
Sample Number: S35489
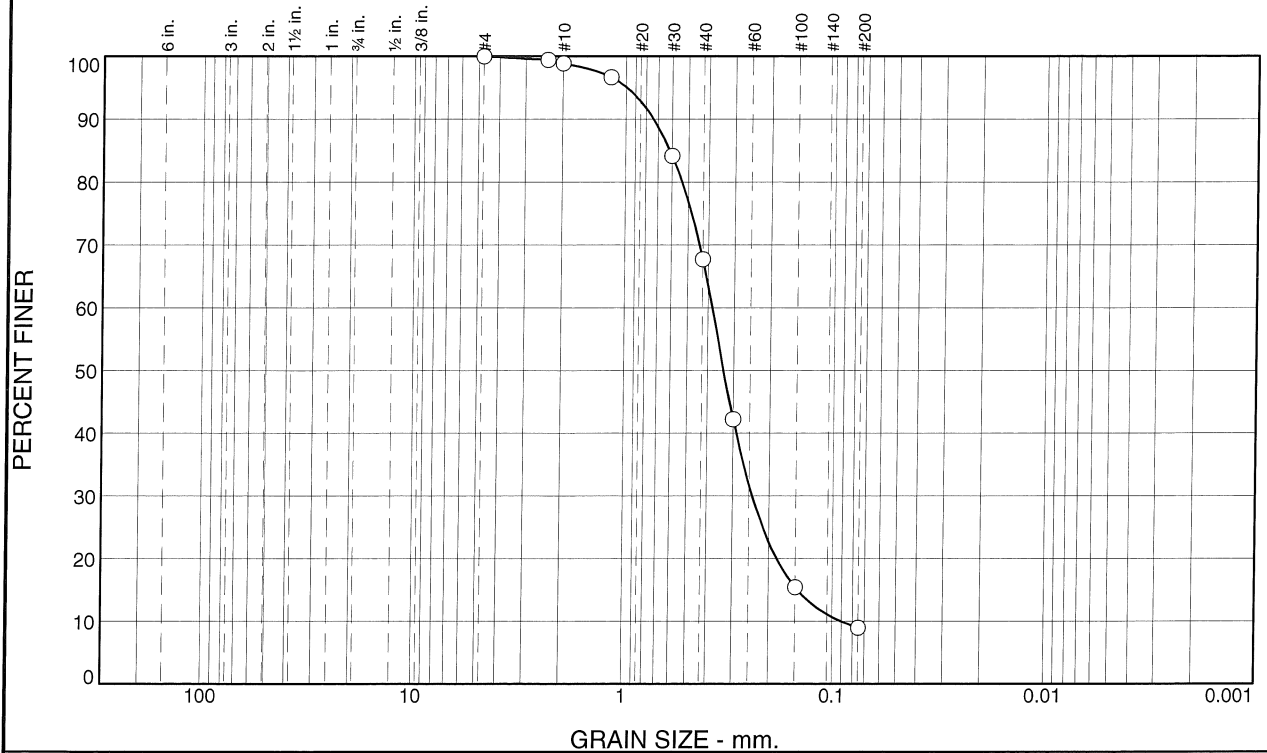
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
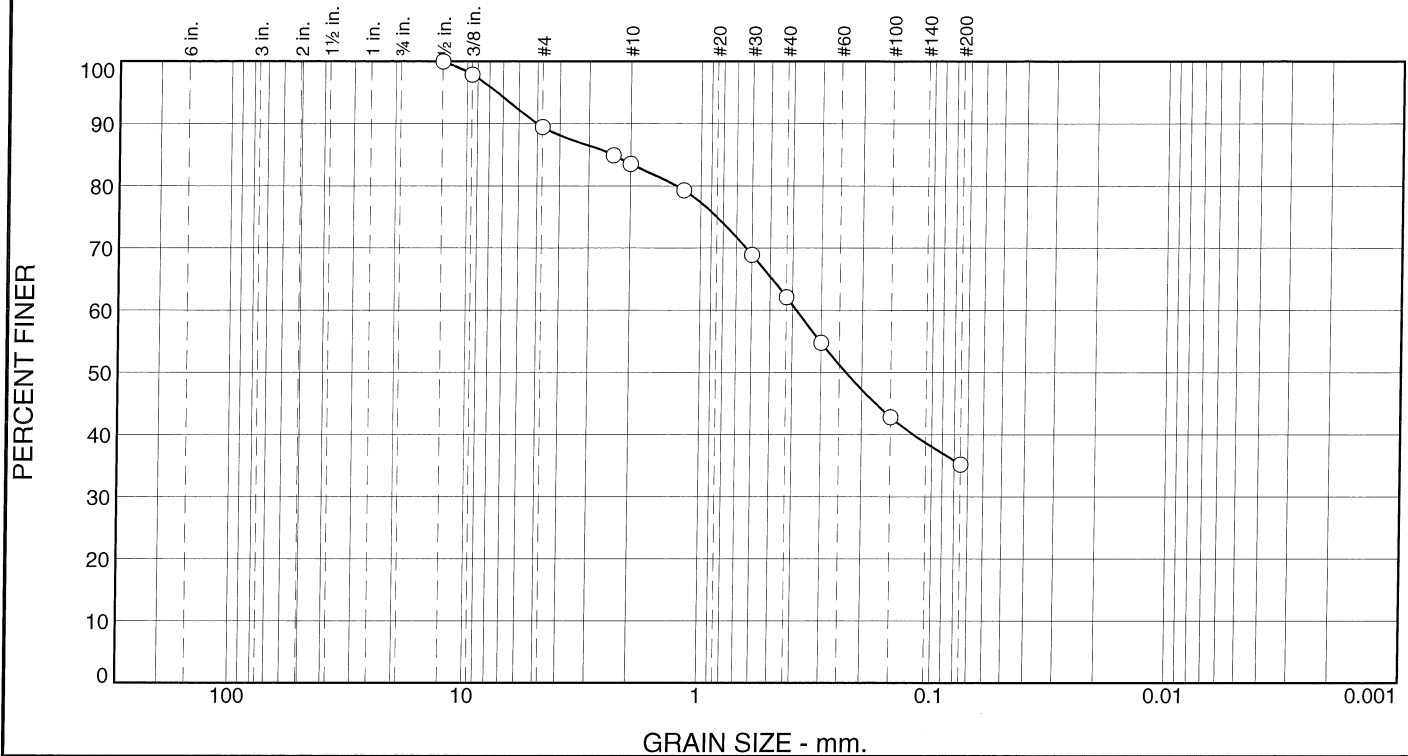
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.5	5.9	21.5	26.9	35.2	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2 Inch	100.0		
3/8 Inch	97.9		
#4	89.5		
#8	85.0		
#10	83.6		
#16	79.3		
#30	69.0		
#40	62.1		
#50	54.8		
#100	42.9		
#200	35.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 4.9961 D_{85}= 2.3751 D_{60}= 0.3841
D_{50}= 0.2341 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks
friable particles

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0001R, S08
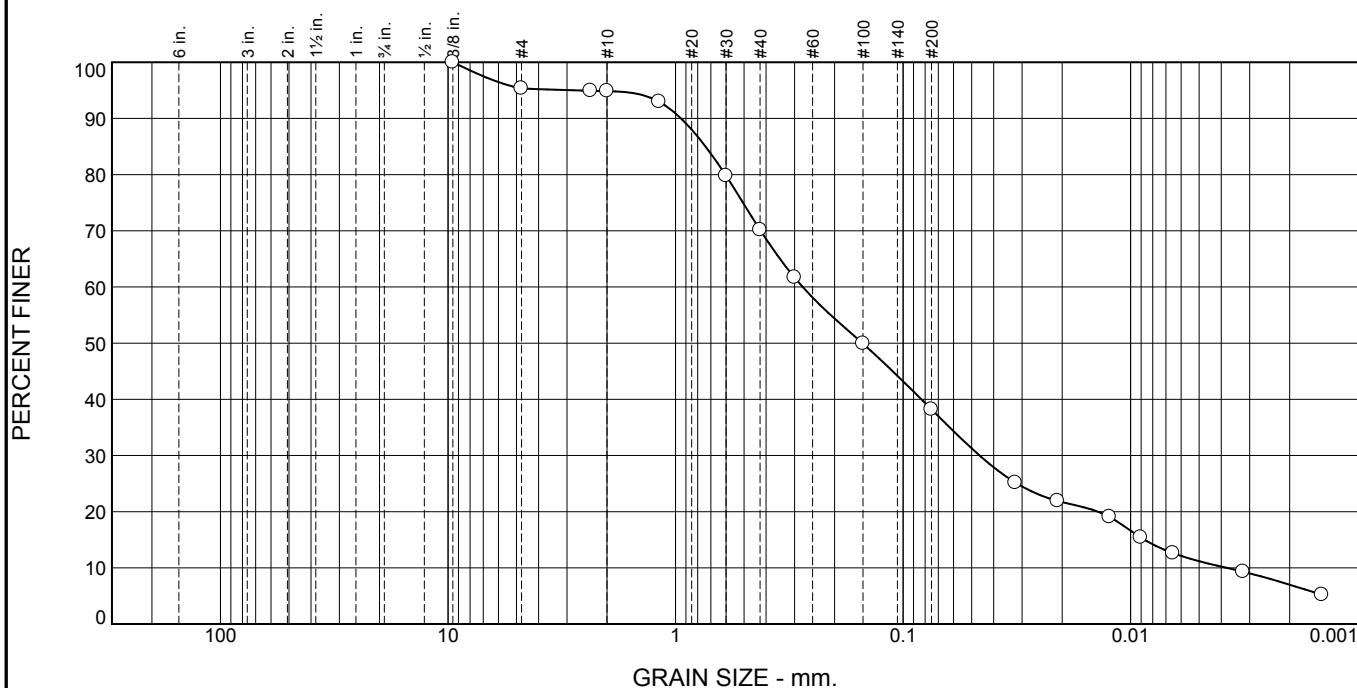**Sample Number:** S35490   **Depth:** 14-15.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
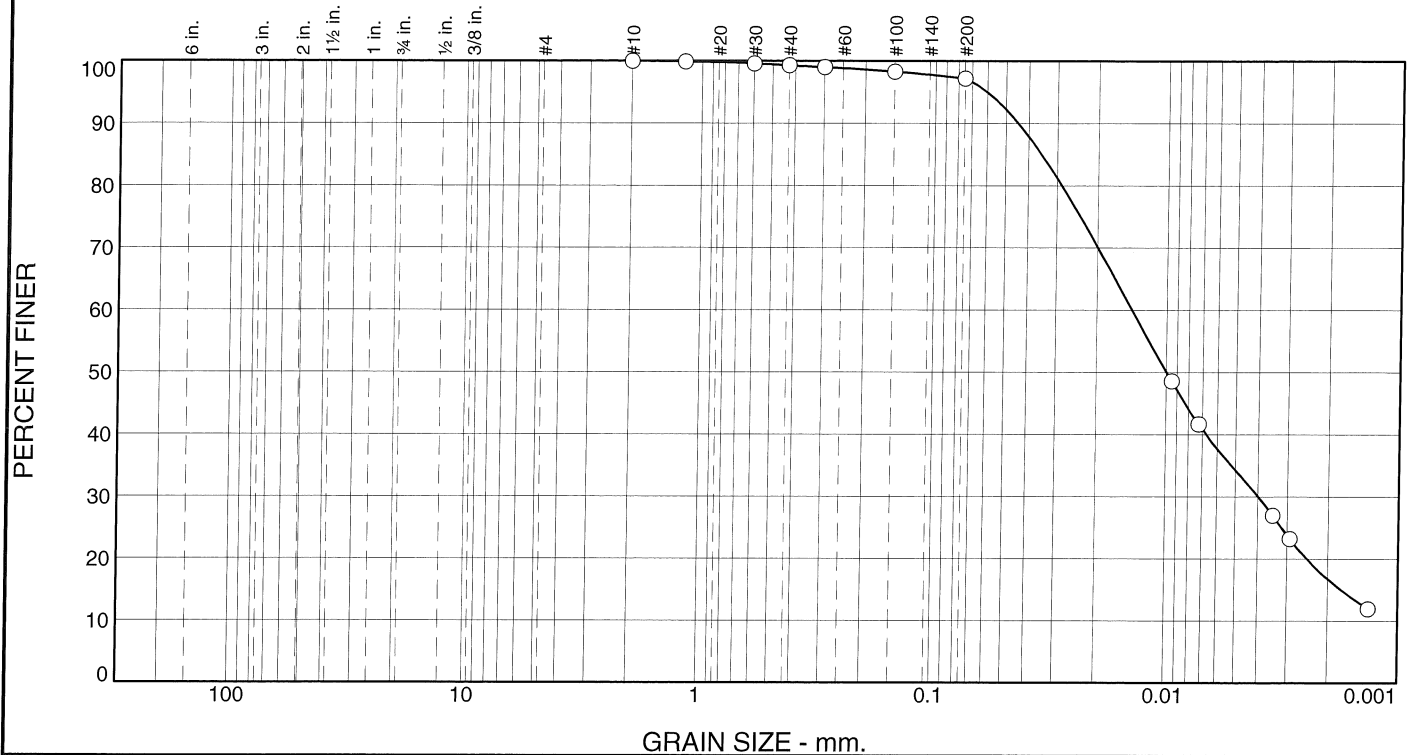
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	2.1	63.0	34.2

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.9		
#30	99.6		
#40	99.3		
#50	99.0		
#100	98.3		
#200	97.2		
0.0095 mm.	48.6		
0.0072 mm.	41.7		
0.0035 mm.	27.0		
0.0029 mm.	23.2		
0.0013 mm.	11.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 23   LL= 37   PI= 14

Classification
USCS (D 2487)= CL   AASHTO (M 145)= A-6(15)

Coefficients
D_{90}= 0.0444 D_{85}= 0.0351 D_{60}= 0.0141
D_{50}= 0.0100 D_{30}= 0.0040 D_{15}= 0.0017
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: js/ns/jm

Checked By: js

Title: PM

Location: S0001R, S14
Sample Number: S35502   Depth: 45-46.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

Chart: PERCENT FINER (y-axis, 0–100) vs GRAIN SIZE - mm. (x-axis, logarithmic from 100 to 0.001). Sieve labels across top: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200.
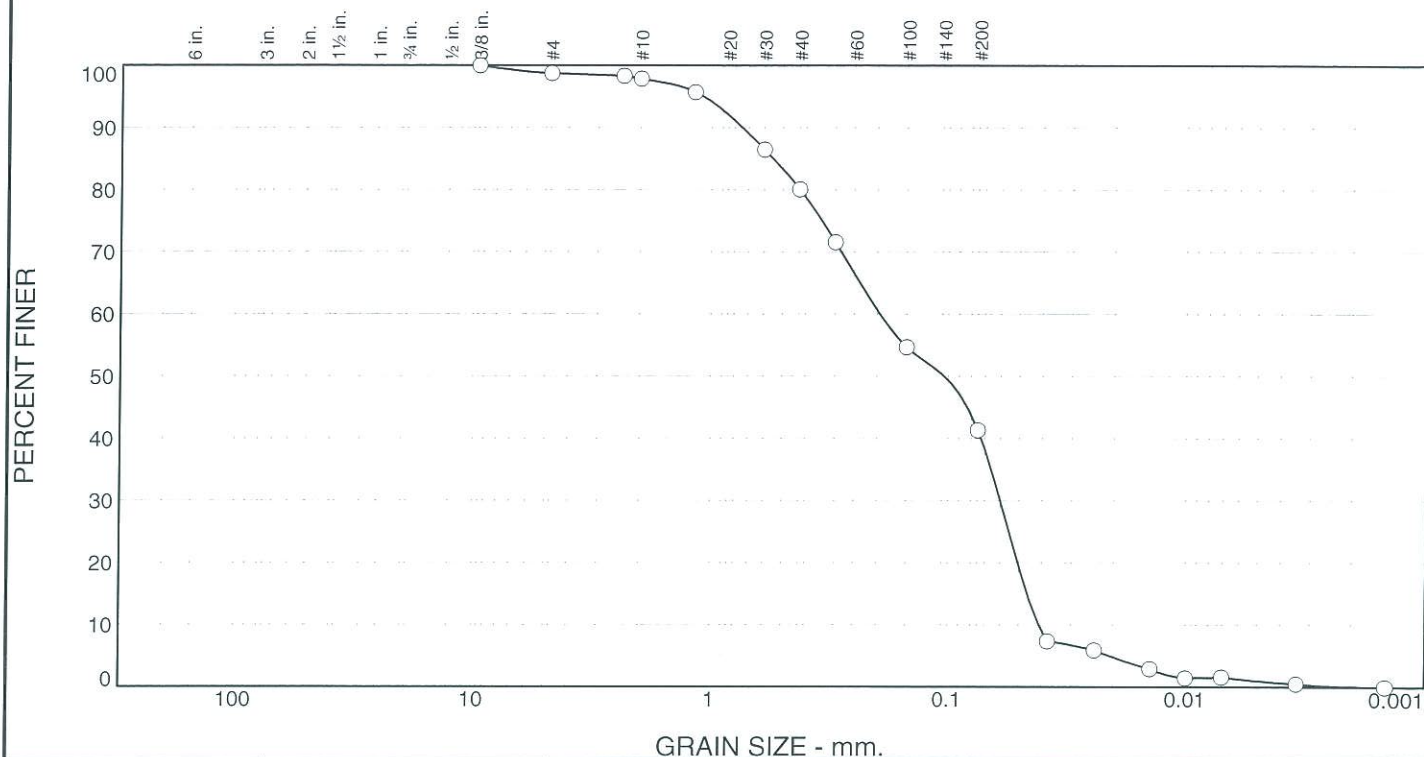
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.2	0.9	17.8	38.8	40.3	1.0

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	98.8		
#8	98.4		
#10	97.9		
#16	95.7		
#30	86.5		
#40	80.1		
#50	71.6		
#100	54.7		
#200	41.3		
0.0378 mm.	7.4		
0.0240 mm.	5.9		
0.0140 mm.	2.9		
0.0100 mm.	1.4		
0.0070 mm.	1.6		
0.0034 mm.	0.5		
0.0014 mm.			

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7436 D_{85}= 0.5510 D_{60}= 0.1947
D_{50}= 0.1041 D_{30}= 0.0602 D_{15}= 0.0461
D_{10}= 0.0411 C_u= 4.73 C_c= 0.45

Remarks

Date Received: 11/16/11   Date Tested: 1/24/12
Tested By: mw/jm
Checked By: cw
Title: PM

Location: S0002R, S04
Sample Number: S35504   Depth: 8-9.3

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.1	68.6	23.8	3.5	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	97.9		
#10	95.9		
#16	82.4		
#30	43.4		
#40	27.3		
#50	16.3		
#100	6.8		
#200	3.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)= SP   AASHTO (M 145)=

Coefficients
D_{90}= 1.4706 D_{85}= 1.2581 D_{60}= 0.7905
D_{50}= 0.6725 D_{30}= 0.4544 D_{15}= 0.2832
D_{10}= 0.2116 C_u= 3.74 C_c= 1.23

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0002R, S09
Sample Number: S36231   **Depth:** 20-21.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
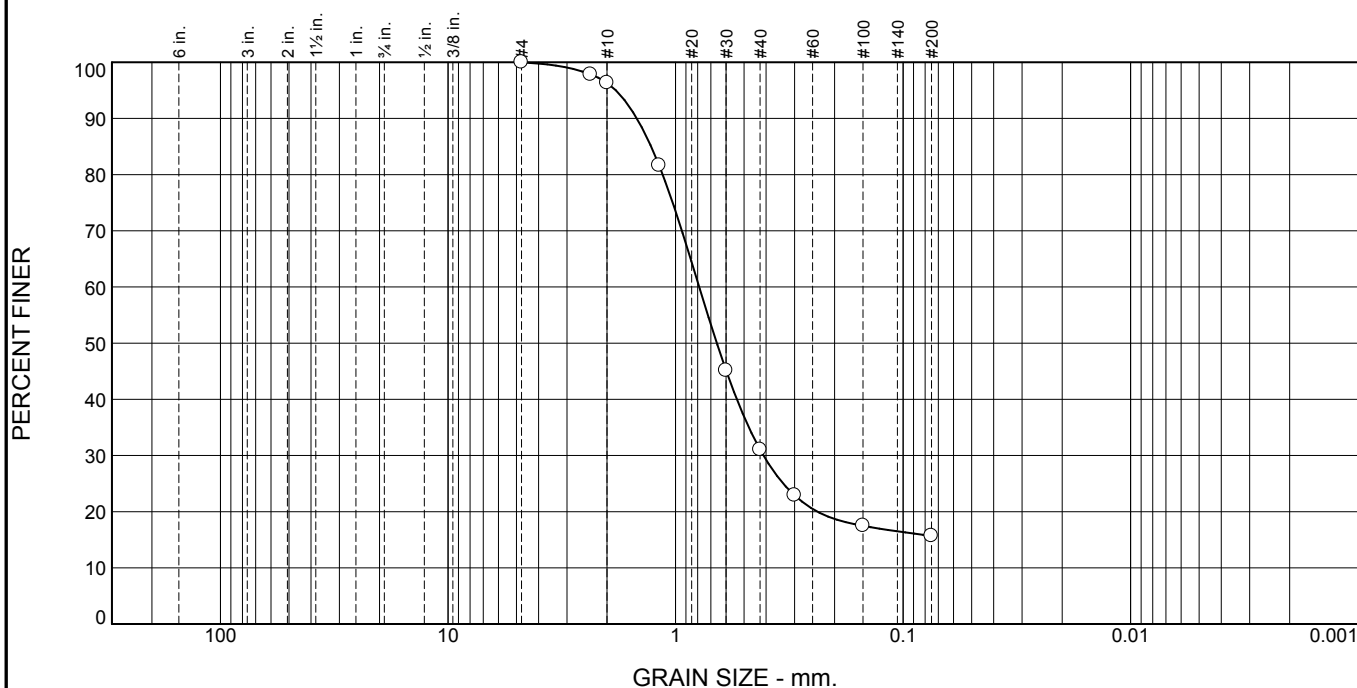
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	3.7	65.3	15.3	15.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	97.8		
#10	96.3		
#16	81.6		
#30	45.1		
#40	31.0		
#50	22.9		
#100	17.5		
#200	15.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 1.4795 D_{85}= 1.2795 D_{60}= 0.7870
D_{50}= 0.6587 D_{30}= 0.4108 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0002R, S10
Sample Number: S35506   **Depth:** 25-26.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
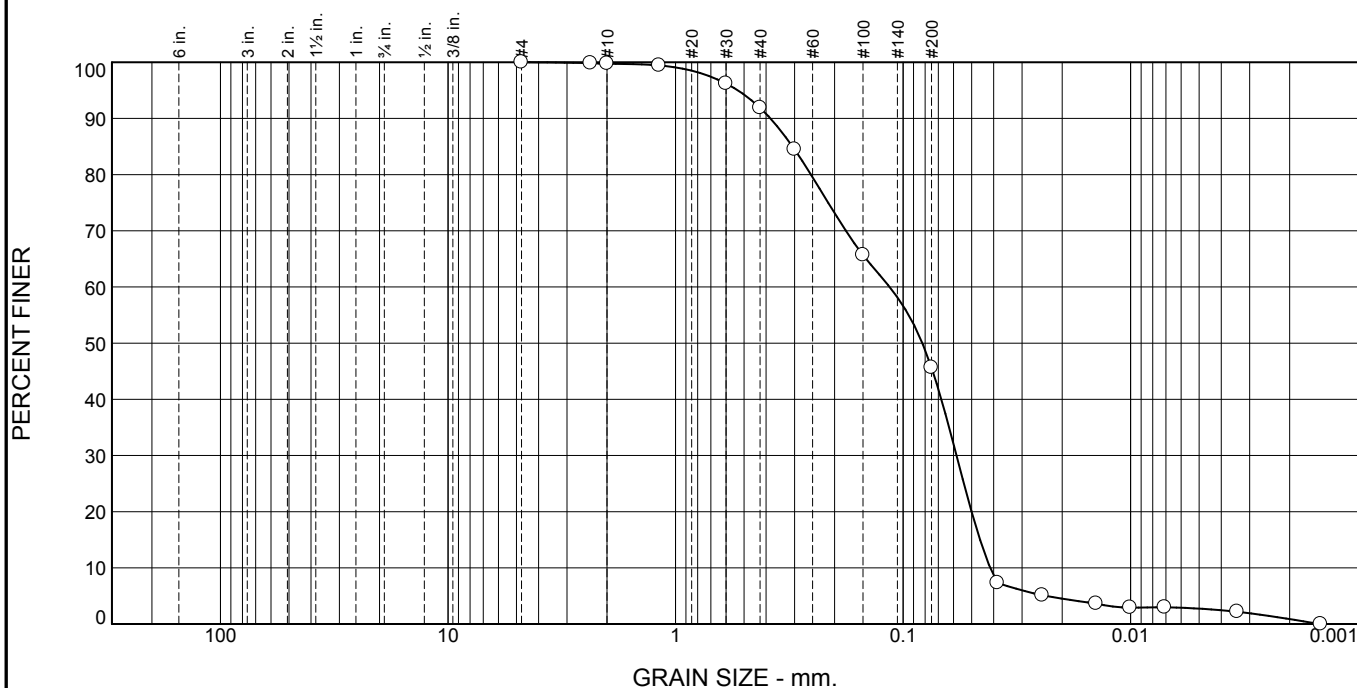
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	7.8	46.3	42.9	2.7

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.8		
#10	99.7		
#16	99.4		
#30	96.2		
#40	91.9		
#50	84.5		
#100	65.7		
#200	45.6		
0.0385 mm.	7.3		
0.0245 mm.	5.1		
0.0142 mm.	3.6		
0.0100 mm.	2.9		
0.0071 mm.	3.0		
0.0034 mm.	2.2		
0.0015 mm.			

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.3830 D_{85}= 0.3062 D_{60}= 0.1146
D_{50}= 0.0823 D_{30}= 0.0583 D_{15}= 0.0459
D_{10}= 0.0414 C_u= 2.77 C_c= 0.71

Remarks

Date Received: 11/1/11 **Date Tested:** 1/24/12
Tested By: mw/jm
Checked By: cw
Title: PM

Location: S0002R, S11
Sample Number: S35507 **Depth:** 30-31.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111 **Figure**

Particle Size Distribution Report
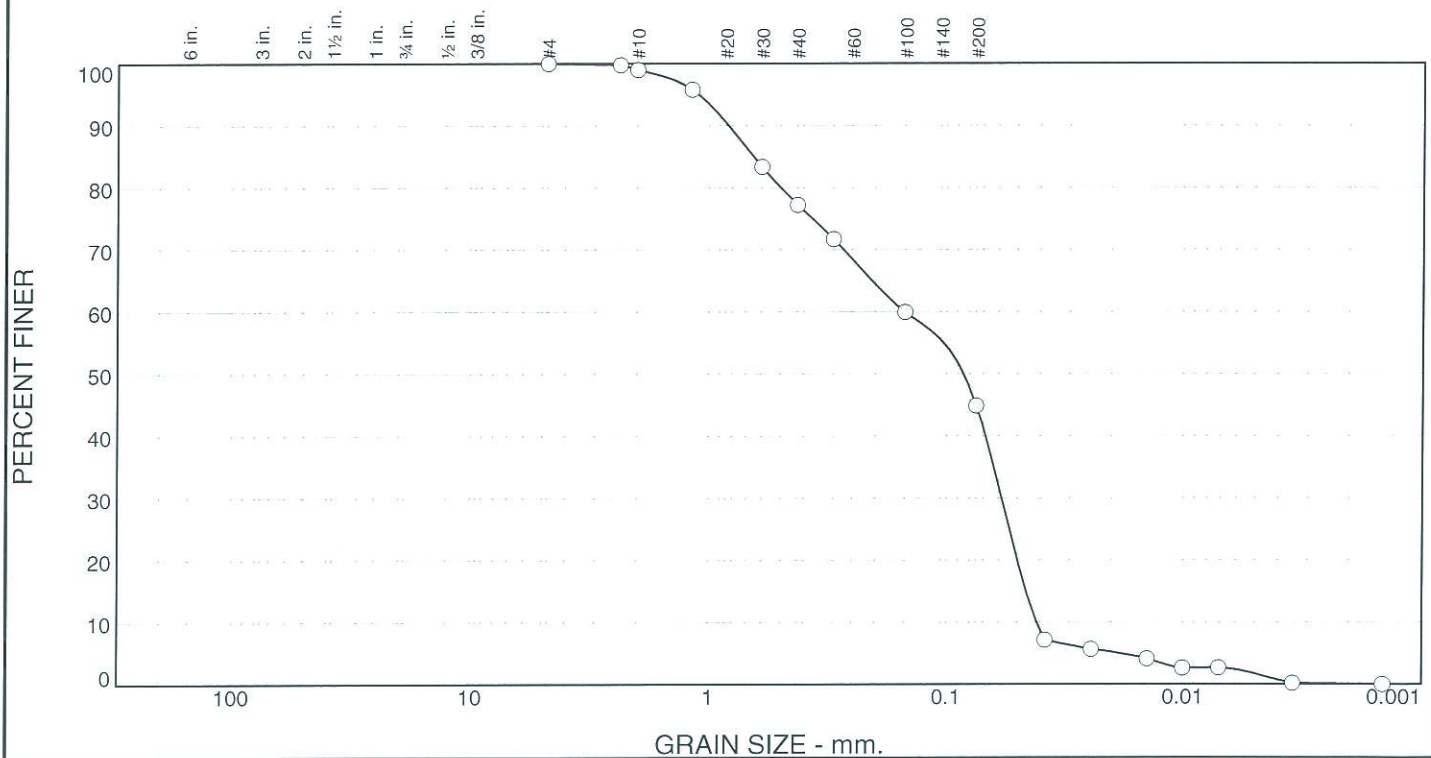
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.0	21.7	32.4	43.2	1.7

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.8		
#10	99.0		
#16	95.8		
#30	83.4		
#40	77.3		
#50	71.8		
#100	59.9		
#200	44.9		
0.0382 mm.	7.2		
0.0243 mm.	5.6		
0.0141 mm.	4.1		
0.0100 mm.	2.6		
0.0071 mm.	2.7		
0.0034 mm.	0.2		
0.0014 mm.			

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.8291 D_{85}= 0.6497 D_{60}= 0.1506
D_{50}= 0.0849 D_{30}= 0.0583 D_{15}= 0.0458
D_{10}= 0.0414 C_u= 3.64 C_c= 0.55

Remarks

Date Received: 11/1/11   **Date Tested:** 1/24/12
Tested By: mw/jm
Checked By: cw
Title: PM

Location: S0003R, S03B
Sample Number: S35517   **Depth:** 7.2-8.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	2.6	22.3	31.6	43.1	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.6		
#8	98.1		
#10	97.0		
#16	91.9		
#30	80.2		
#40	74.7		
#50	69.3		
#100	57.8		
#200	43.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 1.0409 D_{85}= 0.7806 D_{60}= 0.1692
D_{50}= 0.1025 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0003R, S03B
Sample Number: S35517   Depth: 7.2-8.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.8	7.8	91.2	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.8		
#16	99.6		
#30	99.3		
#40	99.0		
#50	98.6		
#100	97.8		
#200	91.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 23   **LL=** 24   **PI=** 1

Classification
USCS (D 2487)= ML   **AASHTO (M 145)=** A-4(0)

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S09
Sample Number: S35520   **Depth:** 20-21.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

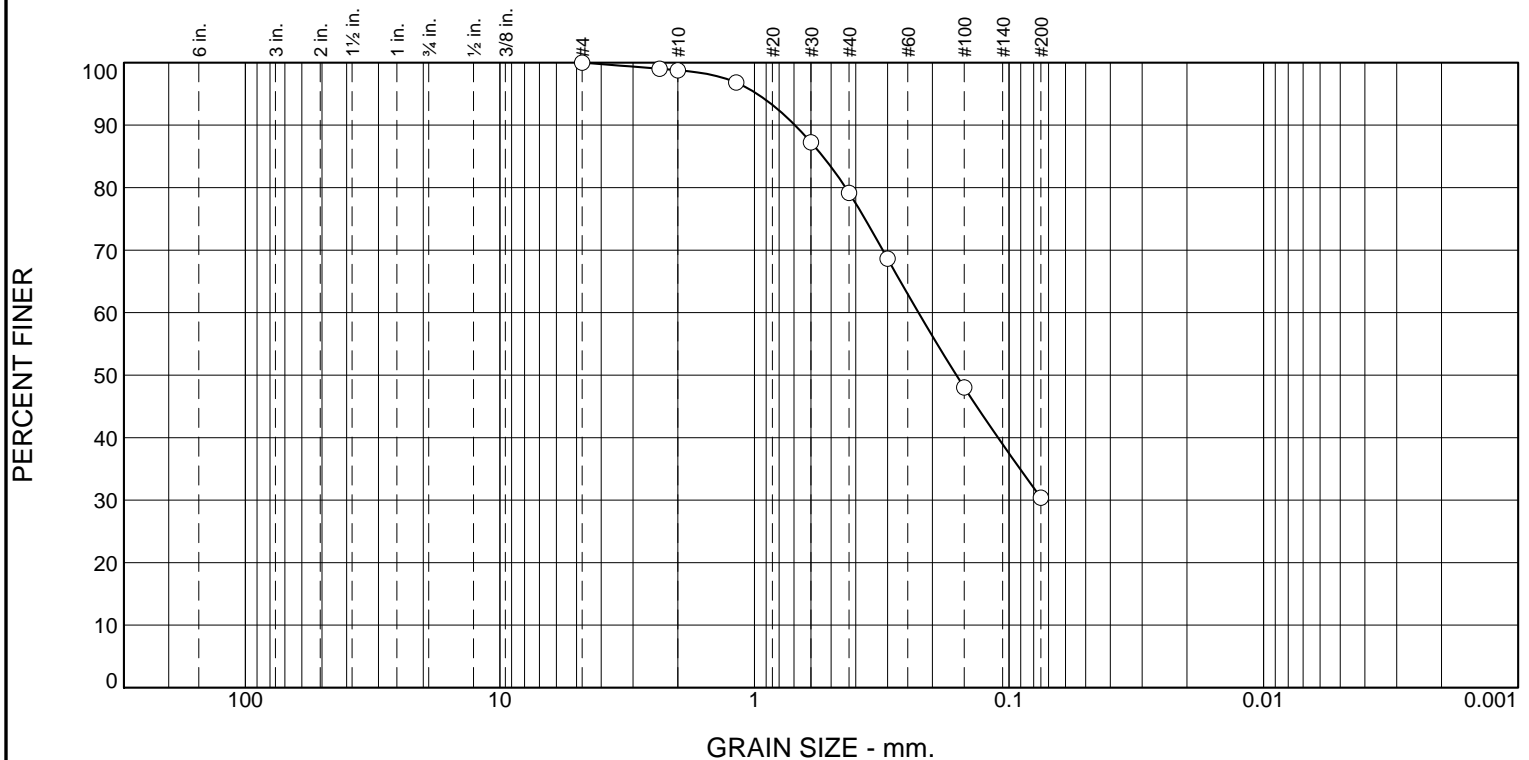**Client:** URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
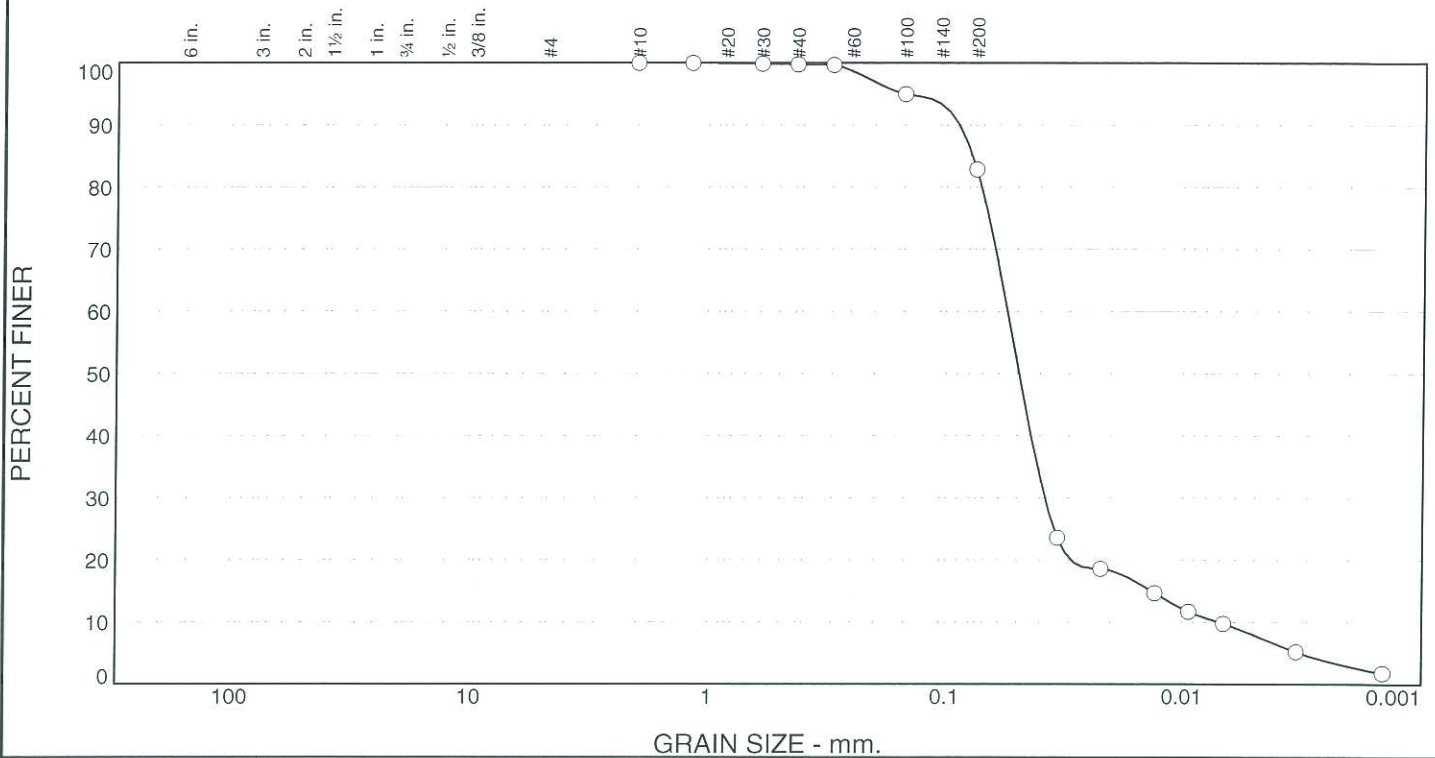
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	17.0	74.9	7.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	99.9		
#40	99.8		
#50	99.7		
#100	95.0		
#200	82.8		
0.0336 mm.	23.6		
0.0220 mm.	18.6		
0.0130 mm.	14.7		
0.0094 mm.	11.7		
0.0067 mm.	9.8		
0.0033 mm.	5.2		
0.0014 mm.	1.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.0892 D_{85}= 0.0782 D_{60}= 0.0552
D_{50}= 0.0492 D_{30}= 0.0380 D_{15}= 0.0135
D_{10}= 0.0070 C_u= 7.89 C_c= 3.74

Remarks

Date Received: 11/16/11   Date Tested: 1/24/12

Tested By: mw/sh/jm

Checked By: cw

Title: PM
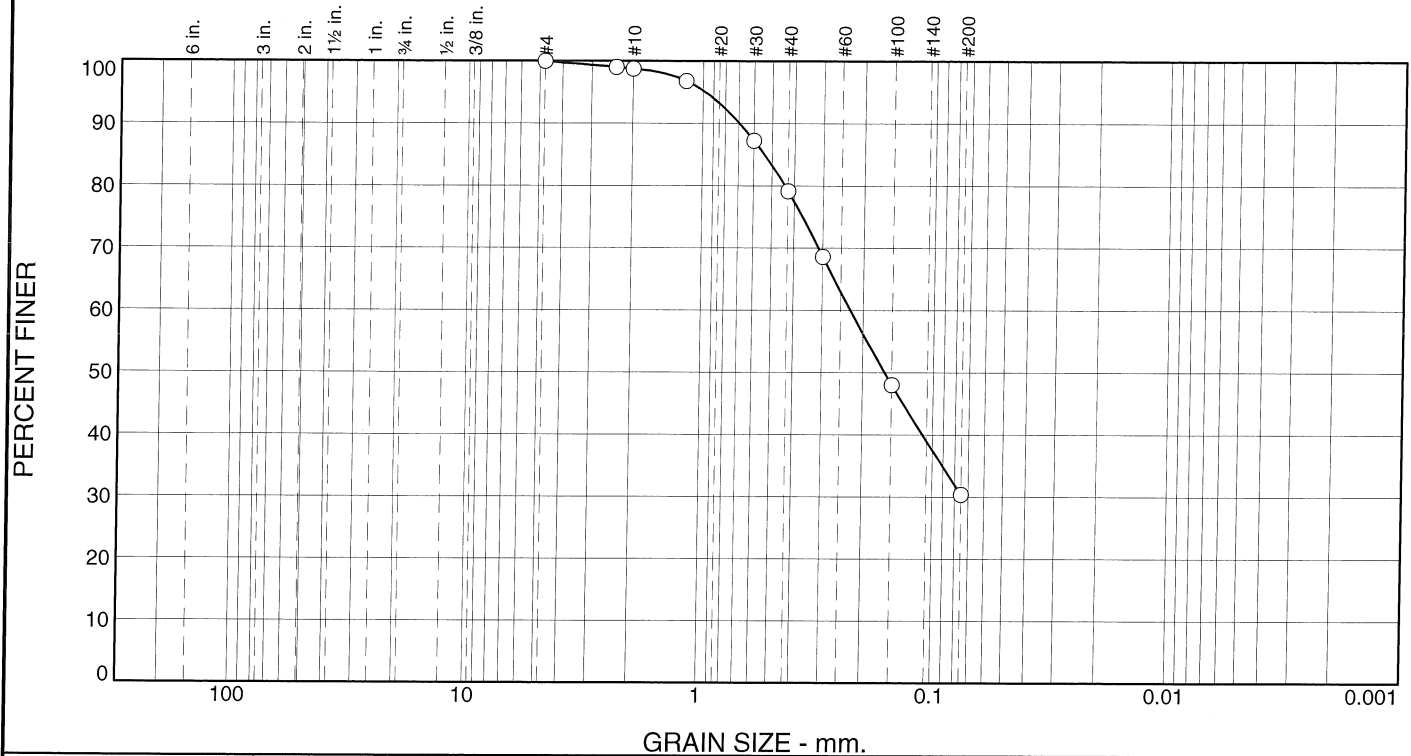
Location: S0004R, S11
Sample Number: S36242   Depth: 30-31.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
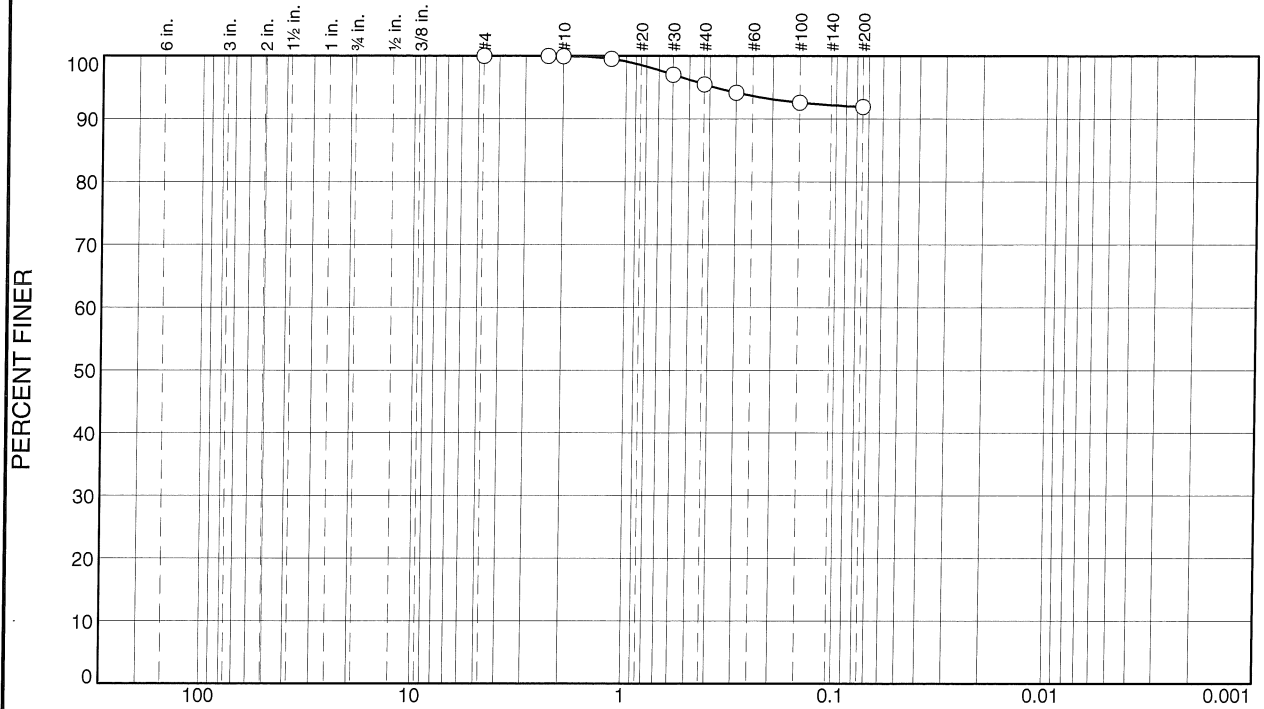
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.5	3.6	91.9	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.5		
#30	97.1		
#40	95.5		
#50	94.2		
#100	92.6		
#200	91.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0005R, S10

Sample Number: S36249   **Depth:** 25-25.8

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
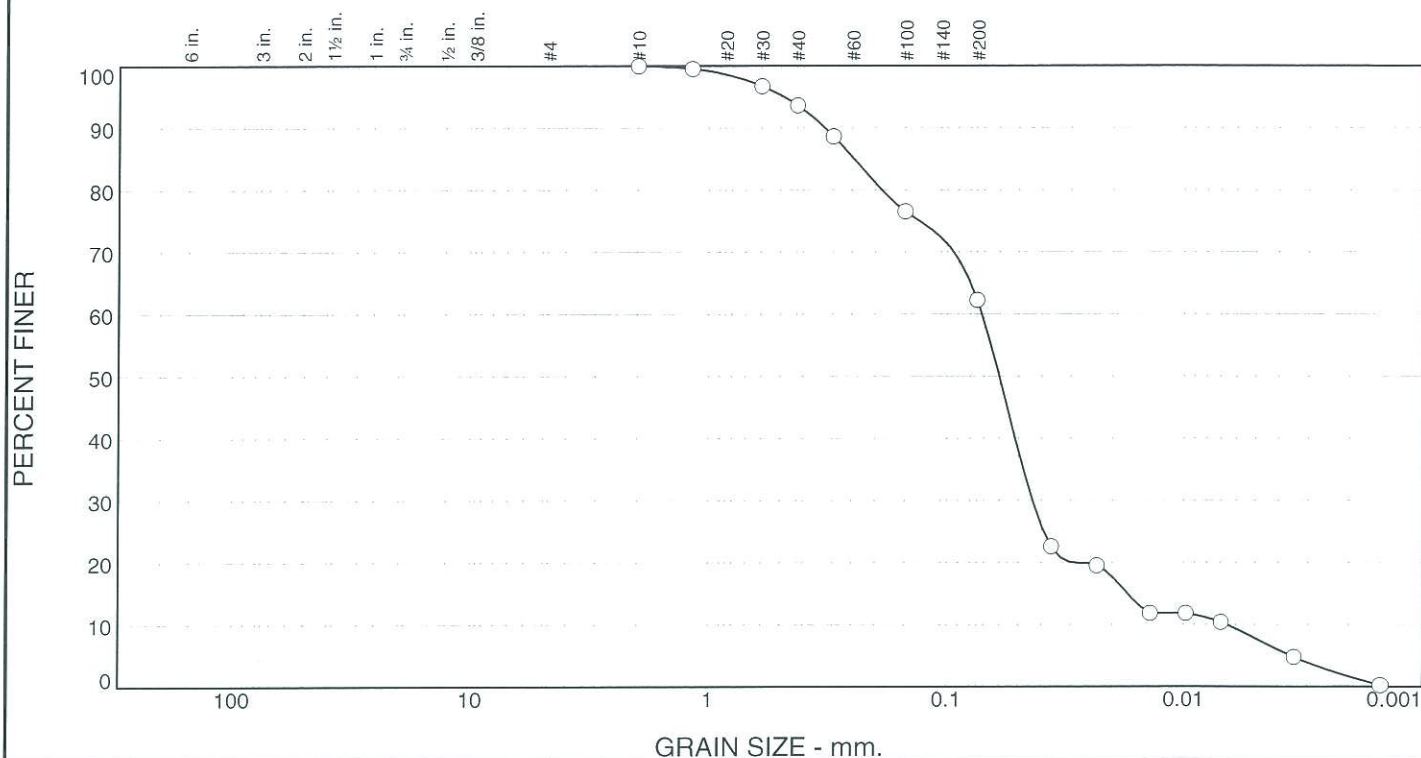
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	6.4	31.3	54.5	7.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.5		
#30	96.7		
#40	93.6		
#50	88.7		
#100	76.6		
#200	62.3		
0.0363 mm.	22.6		
0.0233 mm.	19.5		
0.0139 mm.	11.9		
0.0098 mm.	11.9		
0.0070 mm.	10.4		
0.0034 mm.	4.8		
0.0015 mm.	0.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.3254 D_{85}= 0.2454 D_{60}= 0.0716
D_{50}= 0.0603 D_{30}= 0.0436 D_{15}= 0.0172
D_{10}= 0.0066 C_u= 10.89 C_c= 4.04

Remarks

Date Received: 11/16/11   Date Tested: 1/24/12

Tested By: mw/jm

Checked By: cw

Title: PM

Location: S0005R, S15
Sample Number: S36251   Depth: 46.5-47.5

Date Sampled:

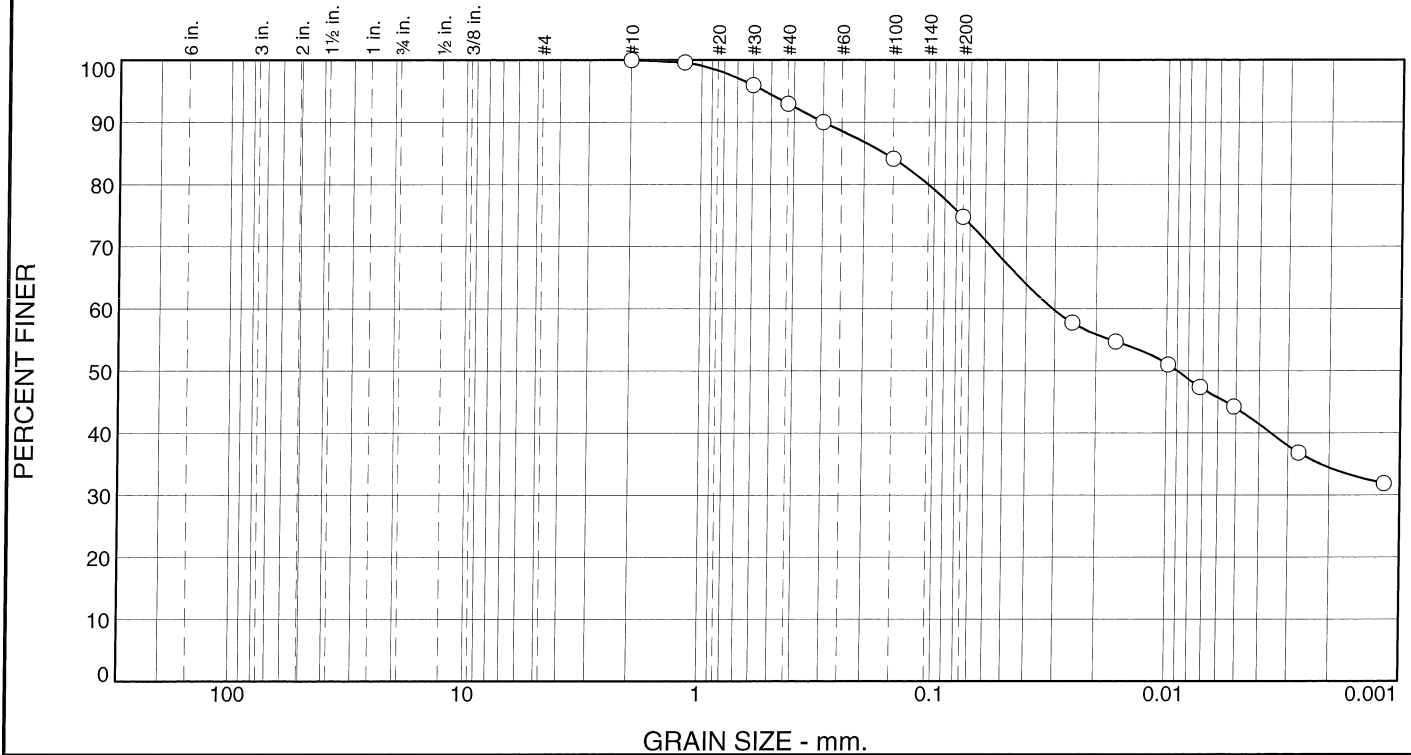## SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.1	31.2	58.7	9.0	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.4		
#10	98.9		
#16	96.7		
#30	84.2		
#40	67.7		
#50	42.3		
#100	15.5		
#200	9.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.7380 D_{85}= 0.6156 D_{60}= 0.3808
D_{50}= 0.3339 D_{30}= 0.2419 D_{15}= 0.1459
D_{10}= 0.0902 C_u= 4.22 C_c= 1.70

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0005R, S18
Sample Number: S36252   Depth: 55-56.3

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes labeled: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.7	0.4	24.7	32.0	27.0	11.2

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	95.3		
#8	94.9		
#10	94.9		
#16	93.0		
#30	79.8		
#40	70.2		
#50	61.7		
#100	49.9		
#200	38.2		
0.0321 mm.	25.2		
0.0209 mm.	21.9		
0.0124 mm.	19.1		
0.0090 mm.	15.4		
0.0065 mm.	12.6		
0.0032 mm.	9.3		
0.0014 mm.	5.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.9462 D_{85}= 0.7381 D_{60}= 0.2763
D_{50}= 0.1510 D_{30}= 0.0461 D_{15}= 0.0087
D_{10}= 0.0038 C_u= 72.98 C_c= 2.03

Remarks

Date Received: 11/1/11   **Date Tested:** 1/24/12

Tested By: js/mw/jm

Checked By: cw

Title: PM

Location: S0005R, S21
Sample Number: S35544   **Depth:** 70-71.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
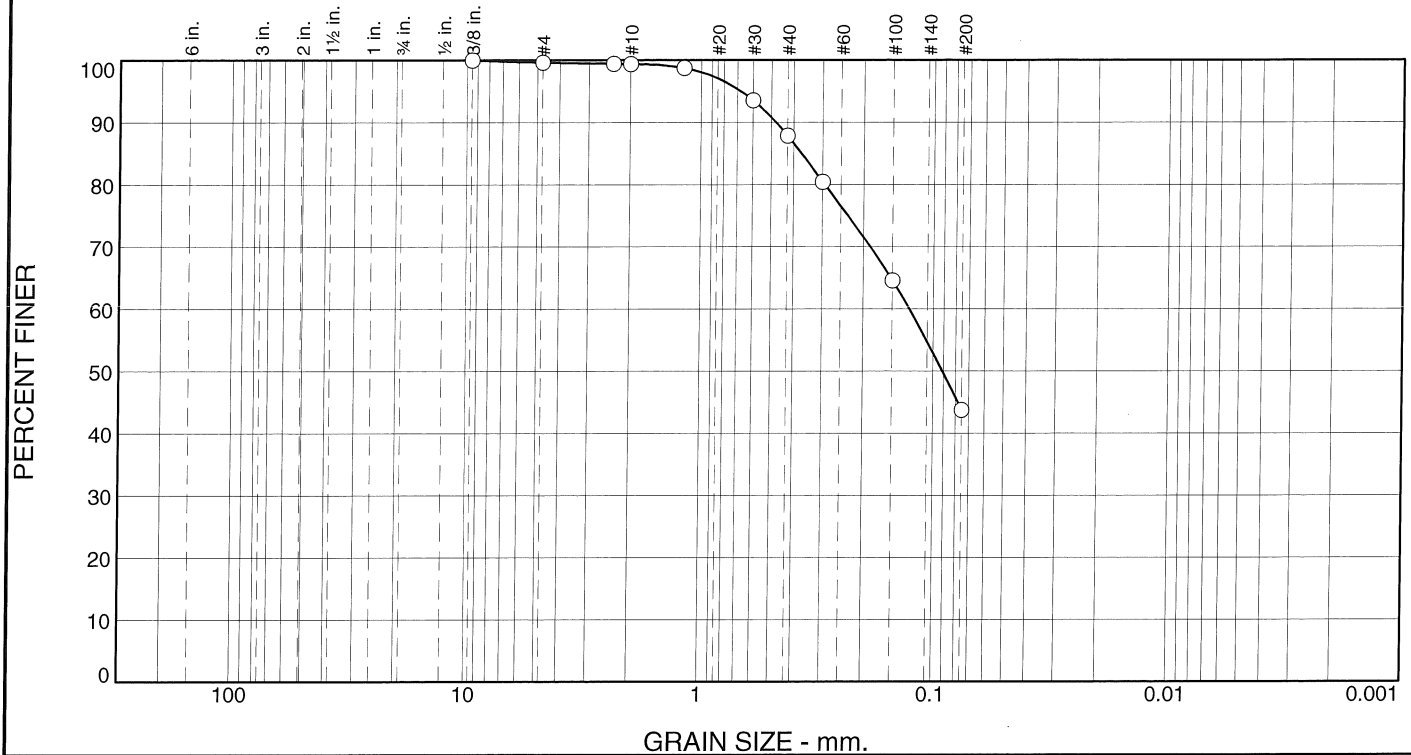
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	0.2	11.5	44.1	43.8	

Test Results (ASTM D 6913 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.6		
#8	99.4		
#10	99.4		
#16	98.7		
#30	93.5		
#40	87.9		
#50	80.5		
#100	64.6		
#200	43.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.4771 D_{85}= 0.3697 D_{60}= 0.1269
D_{50}= 0.0912 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: js

Title: PM

Location: S0006R, S04
Sample Number: S35546   Depth: 8-9.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
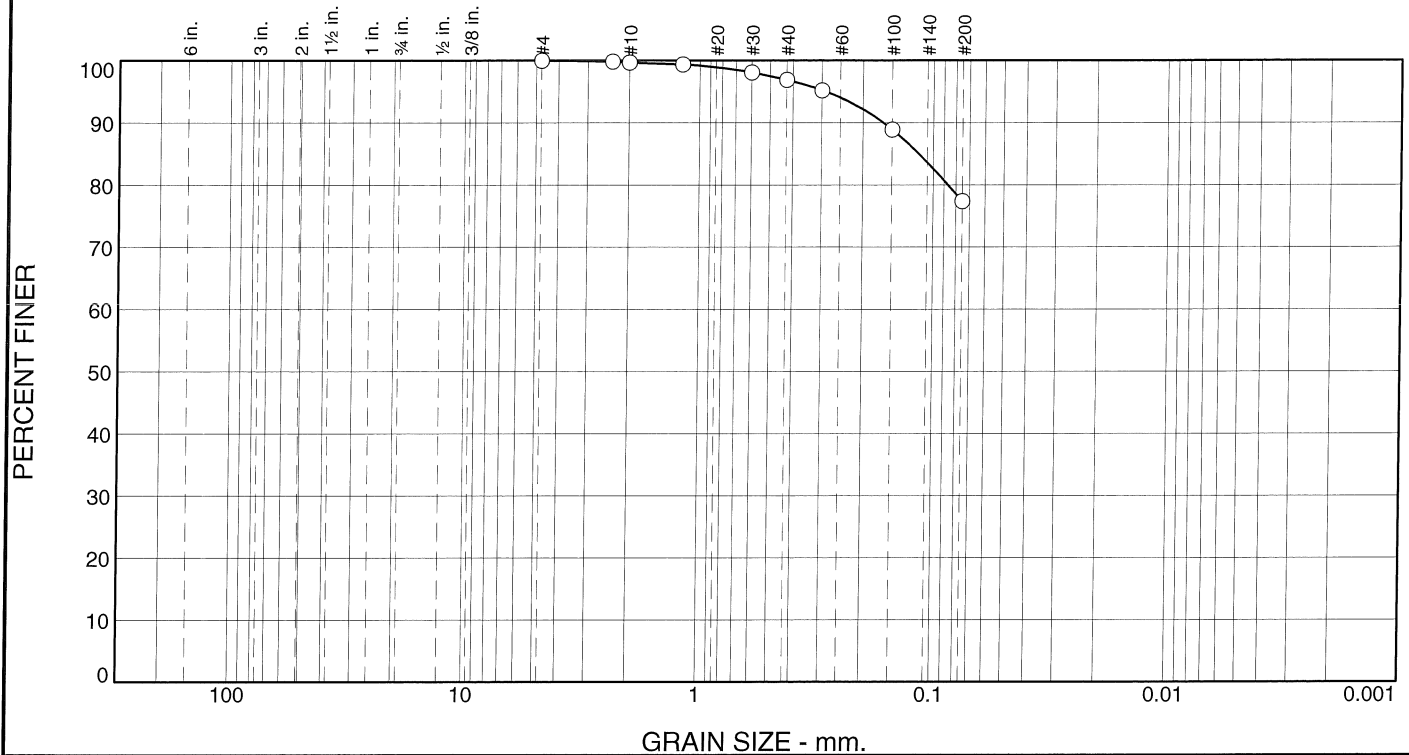
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	2.8	19.5	77.4	

Test Results (ASTM D 6913 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.8		
#10	99.7		
#16	99.4		
#30	98.1		
#40	96.9		
#50	95.2		
#100	88.9		
#200	77.4		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.1637 D_{85}= 0.1155 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac

Checked By: js

Title: PM

* (no specification provided)

Location: S0006R, S10
Sample Number: S35549   **Depth:** 25-26.2   Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	19.7	59.3	20.7	

Test Results (ASTM D 6913 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.8		
#10	99.7		
#16	98.6		
#30	90.8		
#40	80.0		
#50	60.7		
#100	32.3		
#200	20.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.5777 D_{85}= 0.4825 D_{60}= 0.2960
D_{50}= 0.2435 D_{30}= 0.1367 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
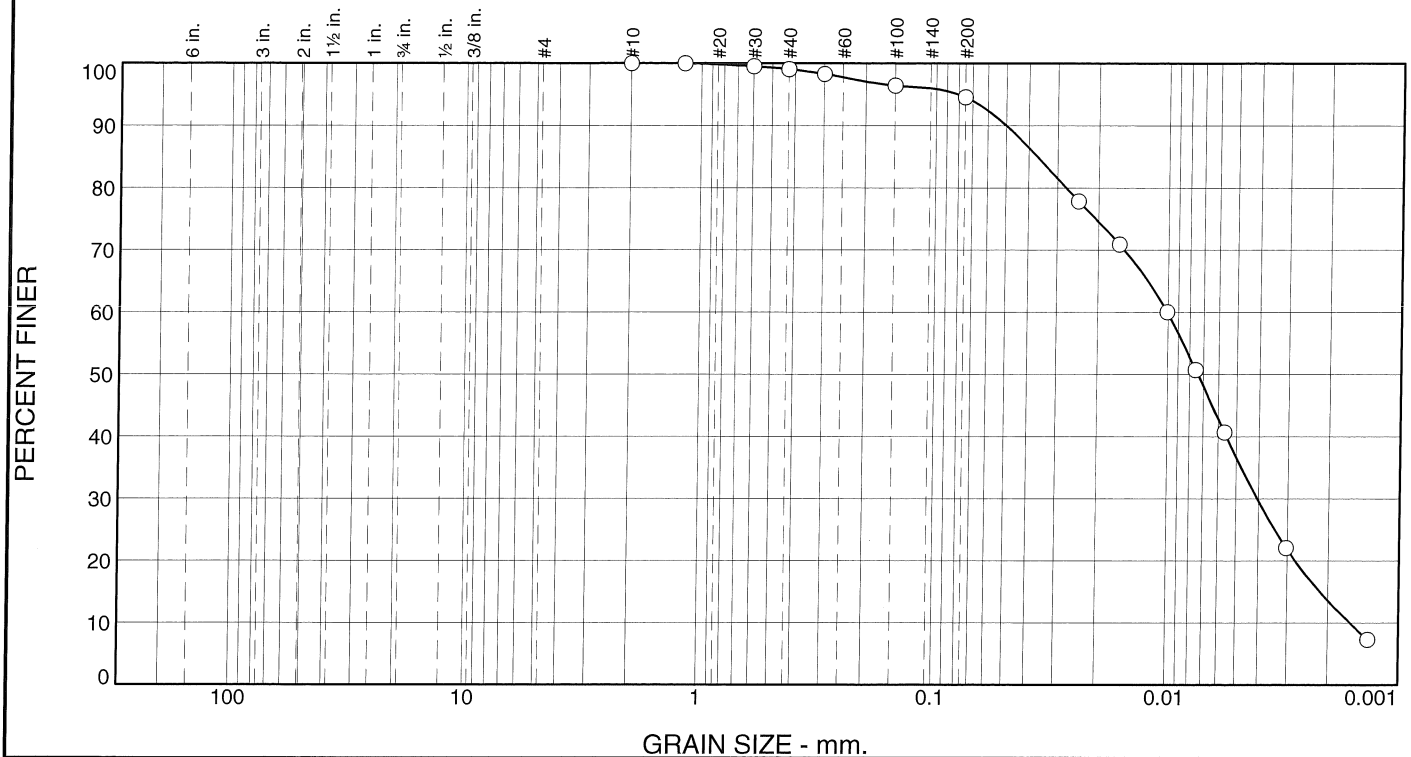
Tested By: ac

Checked By: js

Title: PM

Location: S0006R, S11
Sample Number: S35550   Depth: 30-31.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
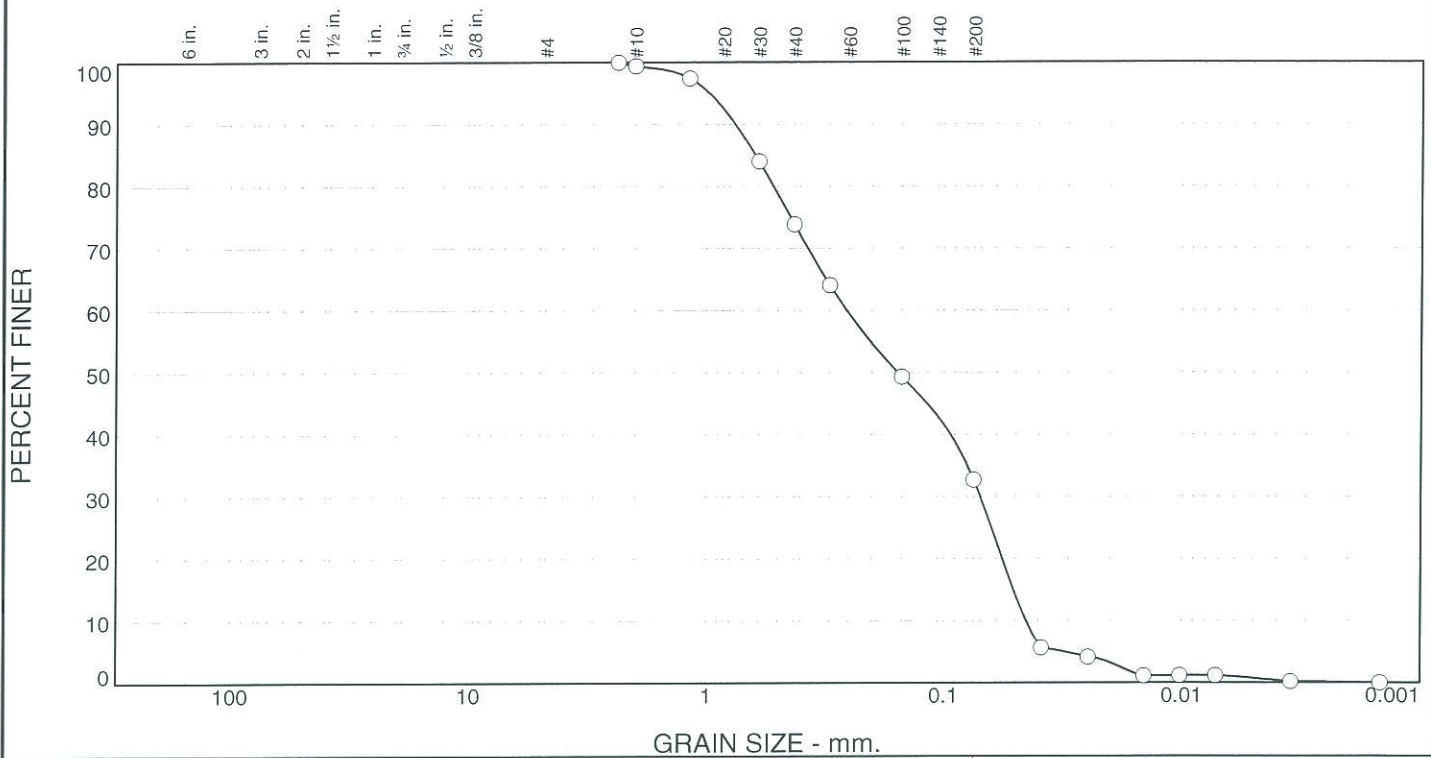
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	25.5	41.2	32.0	0.7

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	99.4		
#16	97.4		
#30	84.1		
#40	73.9		
#50	64.1		
#100	49.3		
#200	32.7		
0.0388 mm.	5.7		
0.0247 mm.	4.1		
0.0144 mm.	1.1		
0.0102 mm.	1.1		
0.0072 mm.	1.2		
0.0035 mm.	0.2		
0.0015 mm.			

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7570 D_{85}= 0.6210 D_{60}= 0.2544
D_{50}= 0.1558 D_{30}= 0.0703 D_{15}= 0.0510
D_{10}= 0.0452 C_u= 5.63 C_c= 0.43

Remarks

Date Received: 11/16/11   Date Tested: 1/24/12

Tested By: mw/jm

Checked By: cw

Title: PM

Location: S0006R, S14
Sample Number: S36254   Depth: 38-39.4

Date Sampled:

**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.6	6.4	42.7	32.7	10.6	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2 Inch	100.0		
3/8 Inch	97.8		
#4	92.4		
#8	88.0		
#10	86.0		
#16	76.4		
#30	55.3		
#40	43.3		
#50	31.4		
#100	16.9		
#200	10.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 3.0137 D_{85}= 1.8561 D_{60}= 0.6873
D_{50}= 0.5145 D_{30}= 0.2867 D_{15}= 0.1270
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: js
Title: PM

Location: S0006R, S16
Sample Number: S35552   Depth: 45-46.1

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
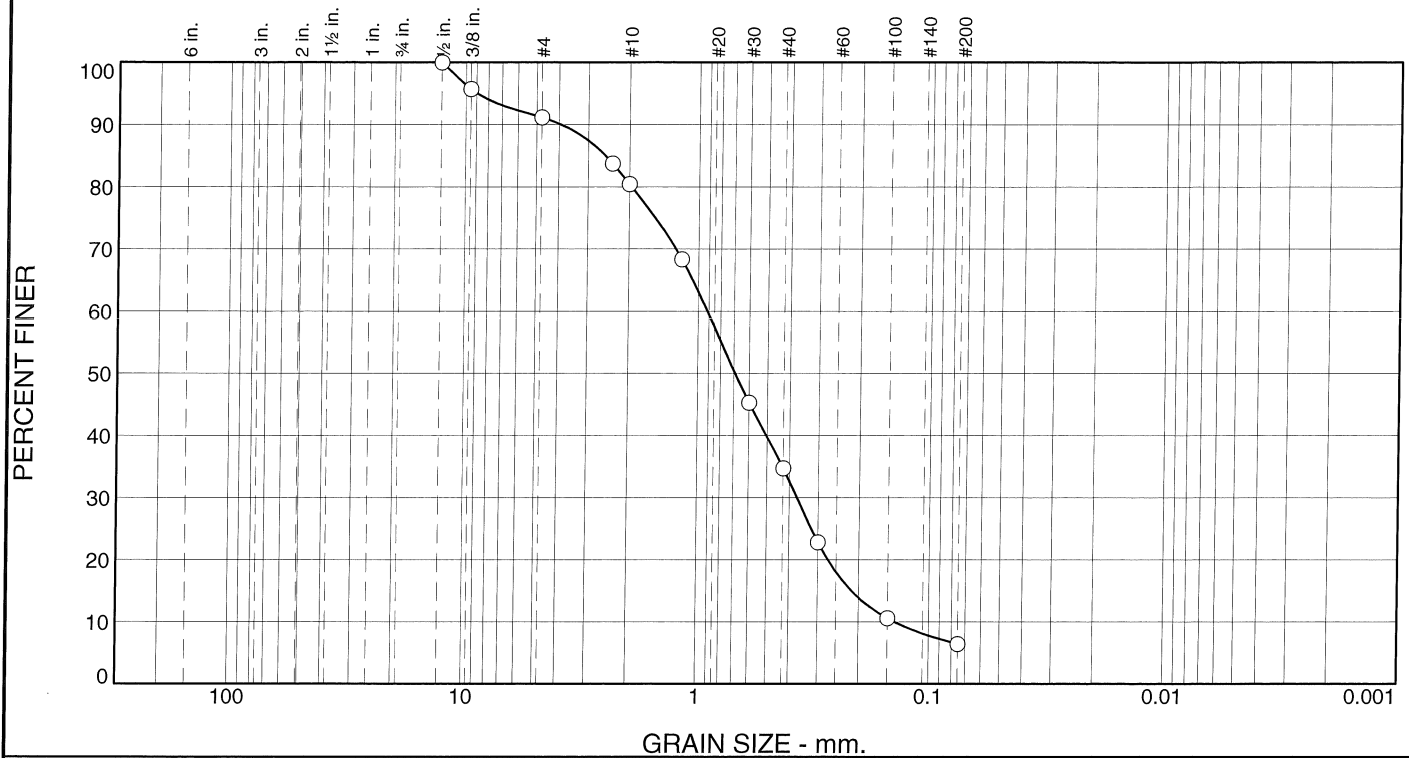
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.8	10.8	45.7	28.3	6.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2 Inch	100.0		
3/8 Inch	95.7		
#4	91.2		
#8	83.8		
#10	80.4		
#16	68.4		
#30	45.3		
#40	34.7		
#50	22.8		
#100	10.6		
#200	6.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 3.9246 D_{85}= 2.5308 D_{60}= 0.9130
D_{50}= 0.6901 D_{30}= 0.3709 D_{15}= 0.2143
D_{10}= 0.1402 C_u= 6.51 C_c= 1.07

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: js

Title: PM

Location: S0006R, S17
Sample Number: S35553   Depth: 50-51.2

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.2	19.6	48.8	30.4	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.0		
#10	98.8		
#16	96.8		
#30	87.3		
#40	79.2		
#50	68.6		
#100	48.0		
#200	30.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.6936 D_{85}= 0.5390 D_{60}= 0.2268
D_{50}= 0.1610 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0007R, S07
Sample Number: S36259   **Depth:** 12.5-14.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.2	19.6	48.8	30.4	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.0		
#10	98.8		
#16	96.8		
#30	87.3		
#40	79.2		
#50	68.6		
#100	48.0		
#200	30.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.6936 D_{85}= 0.5390 D_{60}= 0.2268
D_{50}= 0.1610 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0007R, S07
Sample Number: S36259   Depth: 20-21.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
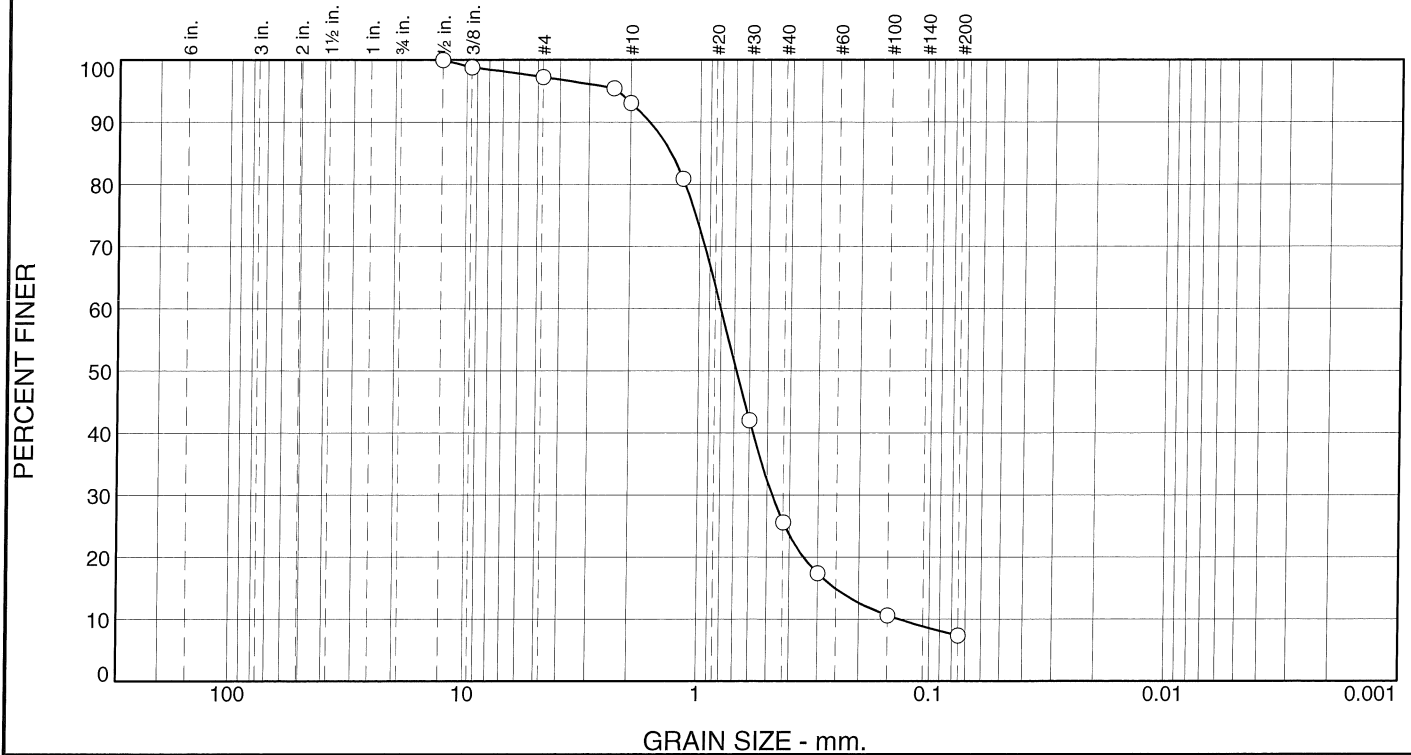
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.7	4.2	67.5	18.2	7.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2 Inch	100.0		
3/8 Inch	98.8		
#4	97.3		
#8	95.5		
#10	93.1		
#16	80.9		
#30	42.1		
#40	25.6		
#50	17.4		
#100	10.6		
#200	7.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 1.6490 D_{85}= 1.3277 D_{60}= 0.8018
D_{50}= 0.6841 D_{30}= 0.4750 D_{15}= 0.2519
D_{10}= 0.1345 C_u= 5.96 C_c= 2.09

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: jm

Checked By: js

Title: PM

Location: S0007R, S09
Sample Number: S35556   Depth: 20-21.1   Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.0	18.2	30.8	44.0

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.6		
#30	95.9		
#40	93.0		
#50	90.0		
#100	84.2		
#200	74.8		
0.0253 mm.	57.8		
0.0165 mm.	54.8		
0.0098 mm.	51.1		
0.0072 mm.	47.4		
0.0051 mm.	44.3		
0.0027 mm.	36.9		
0.0012 mm.	31.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 15   LL= 41   PI= 26

Classification
USCS (D 2487)= CL   AASHTO (M 145)= A-7-6(18)

Coefficients
D_{90}= 0.2982 D_{85}= 0.1633 D_{60}= 0.0306
D_{50}= 0.0089 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: js/ac

Checked By: js

Title: PM

Location: S0007R, S13B
Sample Number: S35560   Depth: 40.8-41.1   Date Sampled:

**SIERRA TESTING LABS, INC.
El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
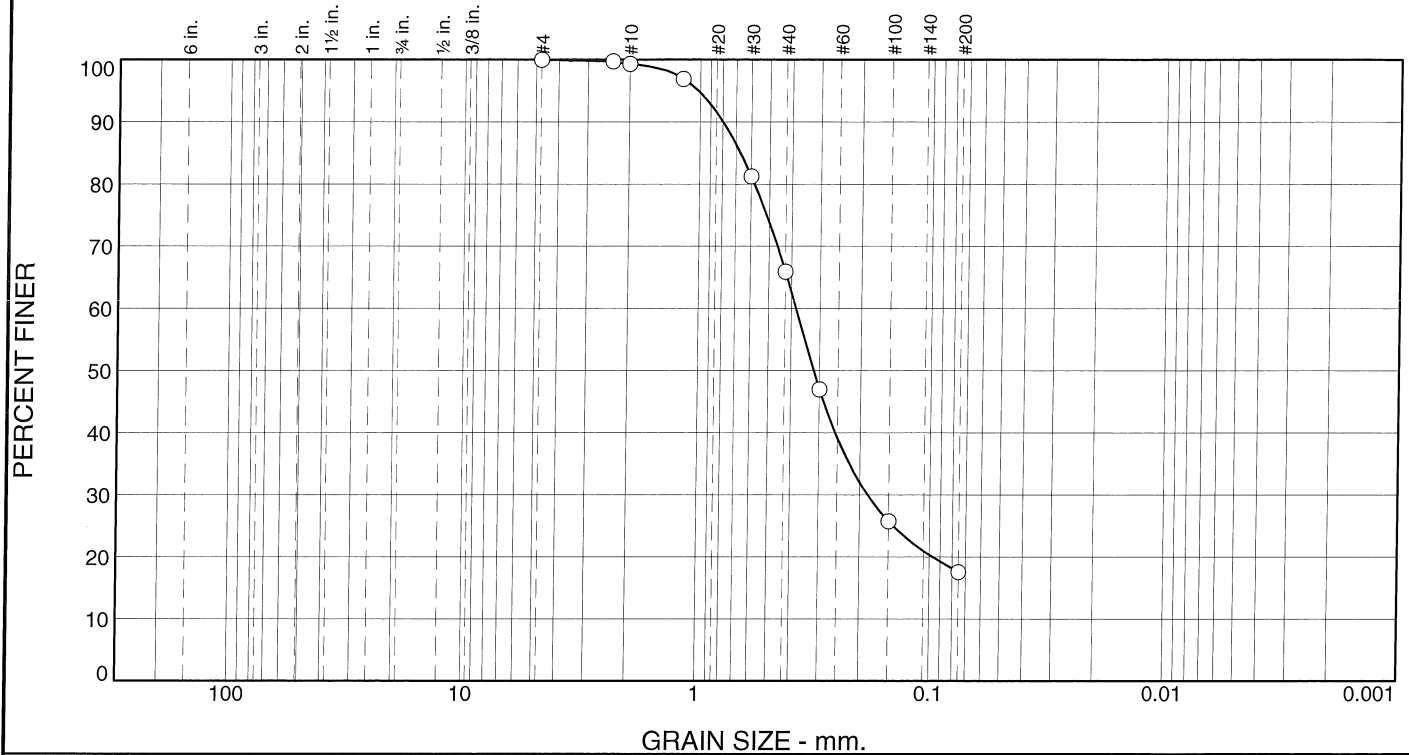
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	33.3	48.4	17.6	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.7		
#10	99.3		
#16	96.9		
#30	81.3		
#40	66.0		
#50	47.0		
#100	25.8		
#200	17.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7965 D_{85}= 0.6686 D_{60}= 0.3810
D_{50}= 0.3180 D_{30}= 0.1849 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: jm

Checked By: js

Title: PM

Location: S0007R, S15
Sample Number: S35562   **Depth:** 50-51.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
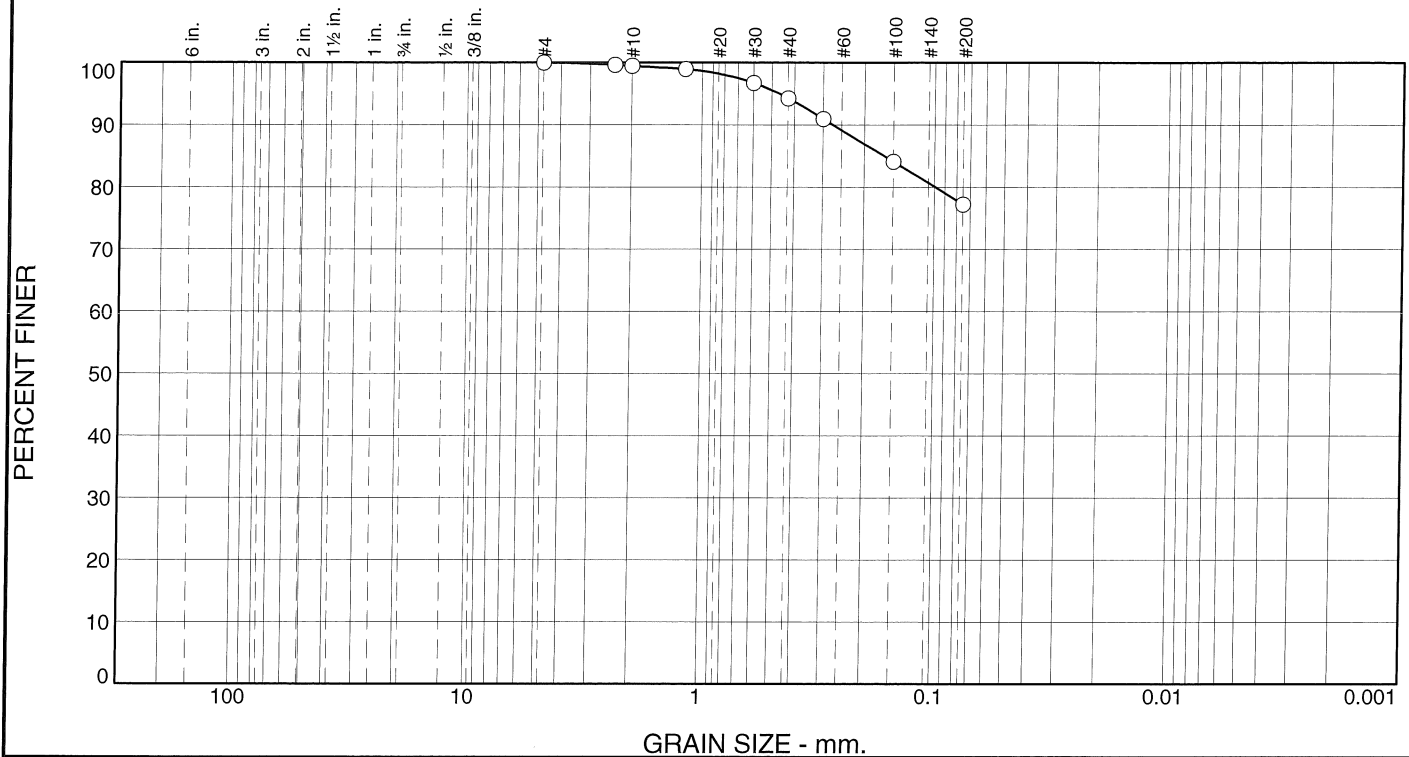
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	5.2	17.0	77.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.5		
#16	98.9		
#30	96.8		
#40	94.3		
#50	91.0		
#100	84.1		
#200	77.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　LL=　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
D_{90}= 0.2726　　D_{85}= 0.1642　　D_{60}=
D_{50}=　　　　D_{30}=　　　　D_{15}=
D_{10}=　　　　C_u=　　　　C_c=

Remarks

Date Received: 11/1/11　　Date Tested: 11/1/11

Tested By: jm

Checked By: js

Title: PM

Location: S0007R, S21
Sample Number: S35567　　Depth: 80-81.1

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111　　　　Figure

Particle Size Distribution Report
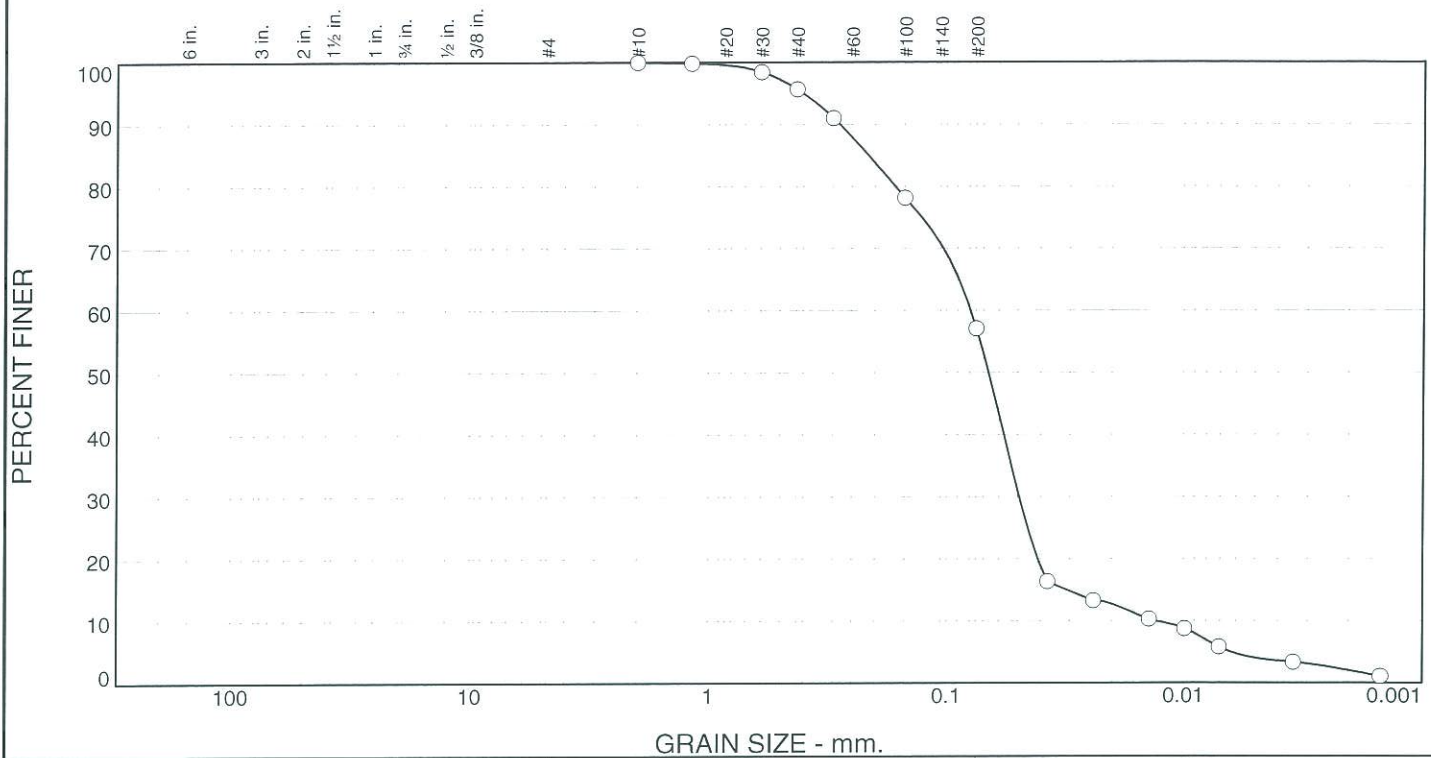
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.3	38.6	53.1	4.0

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.8		
#30	98.5		
#40	95.7		
#50	91.0		
#100	78.2		
#200	57.1		
0.0373 mm.	16.4		
0.0239 mm.	13.3		
0.0139 mm.	10.3		
0.0099 mm.	8.8		
0.0071 mm.	5.8		
0.0034 mm.	3.3		
0.0015 mm.	1.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.2817 D_{85}= 0.2134 D_{60}= 0.0793
D_{50}= 0.0666 D_{30}= 0.0493 D_{15}= 0.0308
D_{10}= 0.0131 C_u= 6.05 C_c= 2.33

Remarks

Date Received: 11/16/11   **Date Tested:** 1/24/12

Tested By: mw/jm

Checked By: cw

Title: PM

Location: S0010R, S09
Sample Number: S36263   **Depth:** 20-21.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

	% Gravel		% Sand			% Fines	
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	4.5	58.0	36.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	99.5		
#40	99.1		
#50	98.3		
#100	96.4		
#200	94.6		
0.0244 mm.	77.9		
0.0162 mm.	70.9		
0.0101 mm.	60.1		
0.0076 mm.	50.8		
0.0057 mm.	40.7		
0.0030 mm.	22.1		
0.0014 mm.	7.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 25   LL= 35   PI= 10

Classification
USCS (D 2487)= ML   AASHTO (M 145)= A-4(10)

Coefficients
D_{90}= 0.0501 D_{85}= 0.0367 D_{60}= 0.0101
D_{50}= 0.0074 D_{30}= 0.0041 D_{15}= 0.0022
D_{10}= 0.0016 C_u= 6.27 C_c= 1.01

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: js/ac
Checked By: js
Title: PM

Location: S0010R, S10
Sample Number: S35571   Depth: 25-26.5   Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
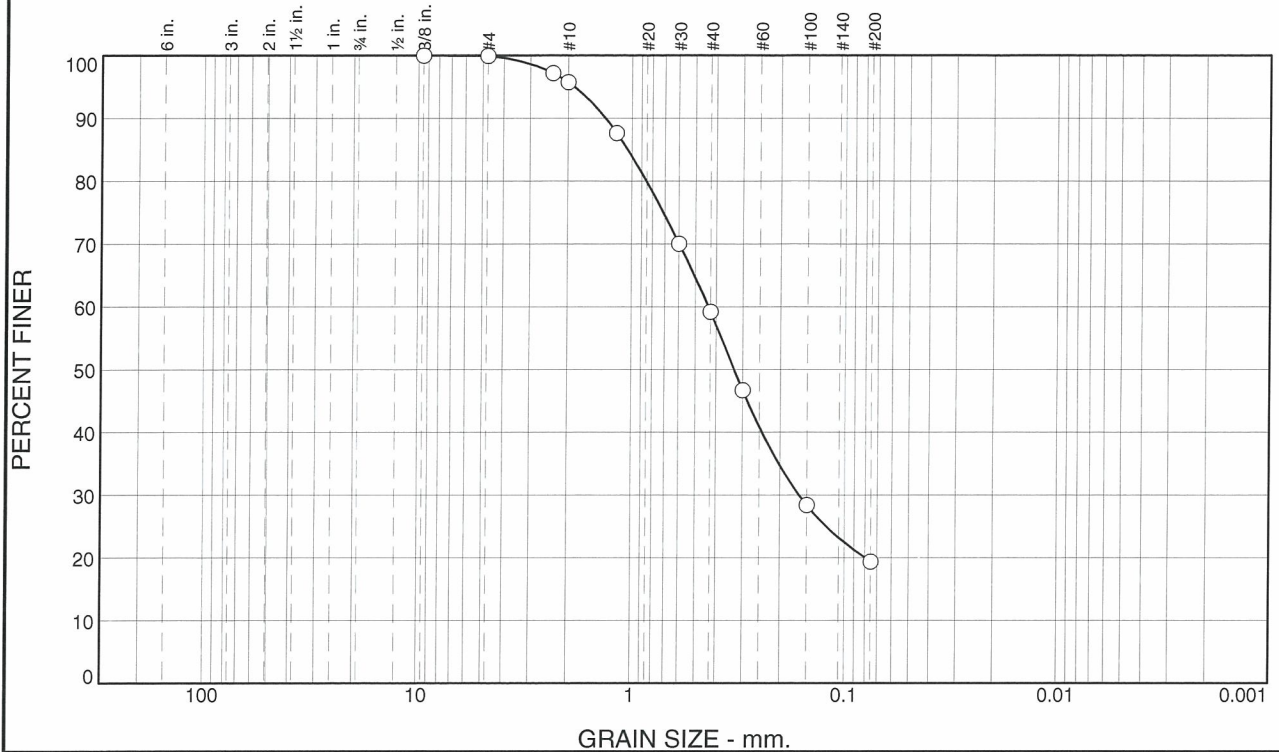Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
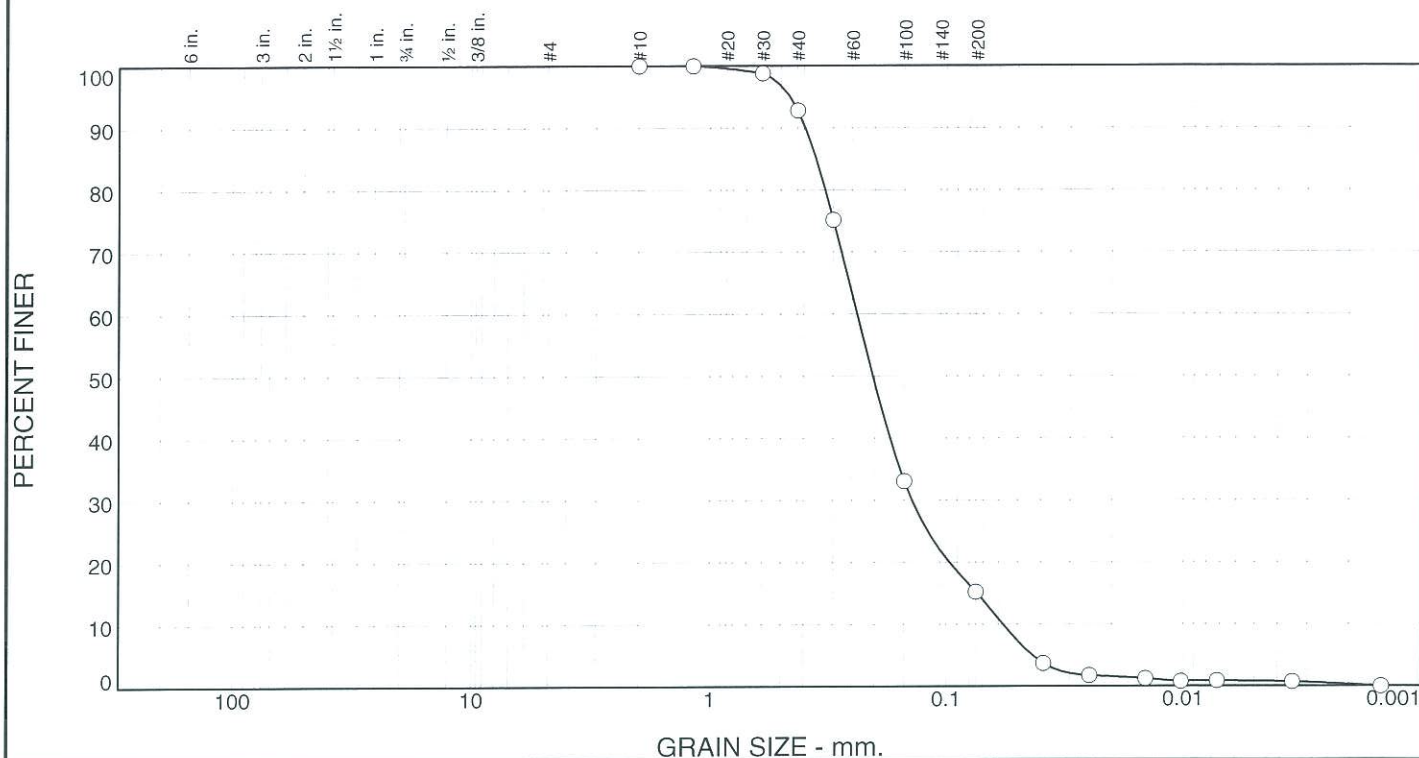
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.2	77.6	14.4	0.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	98.8		
#40	92.8		
#50	75.2		
#100	33.1		
#200	15.2		
0.0389 mm.	3.7		
0.0248 mm.	1.7		
0.0144 mm.	1.2		
0.0102 mm.	0.7		
0.0072 mm.	0.8		
0.0035 mm.	0.7		
0.0015 mm.			

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.3945 D_{85}= 0.3553 D_{60}= 0.2376
D_{50}= 0.2037 D_{30}= 0.1392 D_{15}= 0.0741
D_{10}= 0.0575 C_u= 4.13 C_c= 1.42

Remarks

Date Received: 11/16/11   **Date Tested:** 1/24/12

Tested By: mw/jm

Checked By: cw

Title: PM

Location: S0010R, S12

Sample Number: S36265   **Depth:** 35-36.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
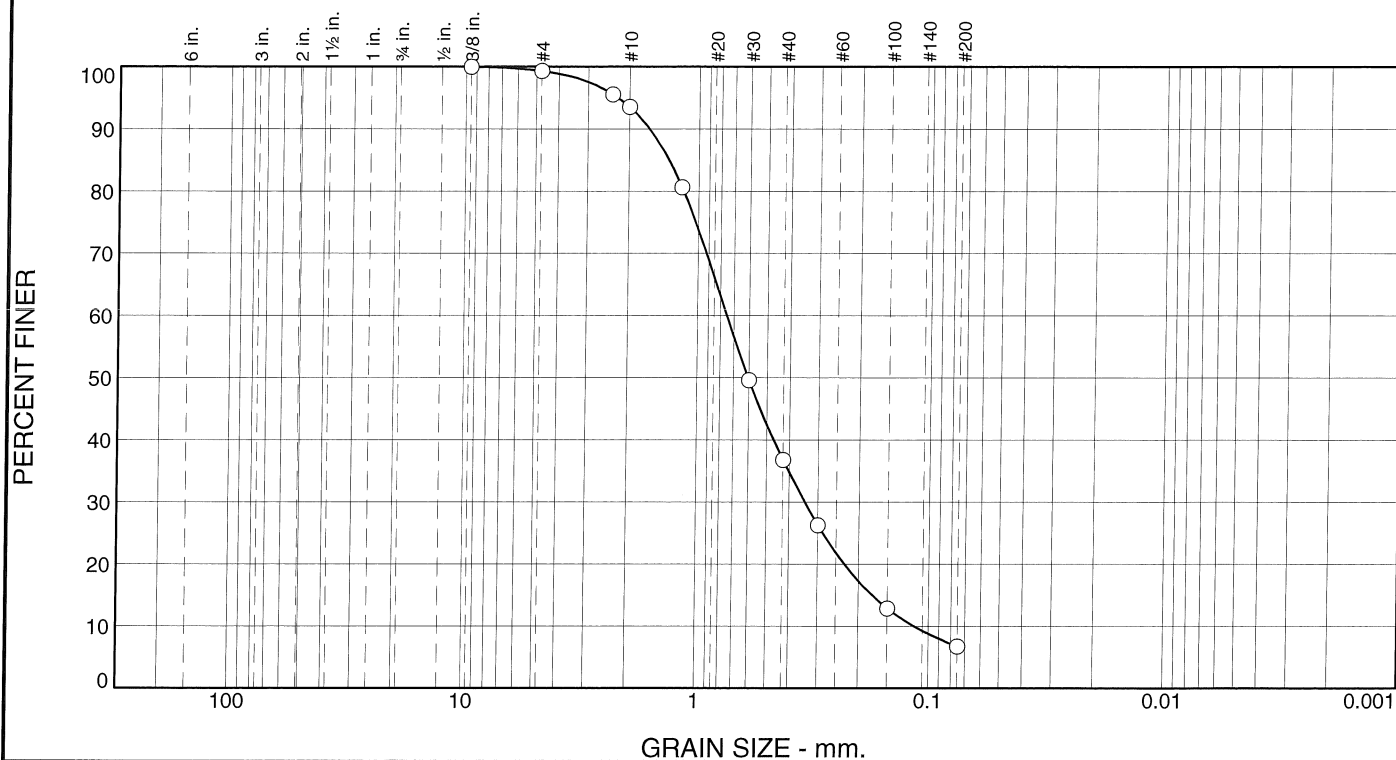
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	5.8	56.7	30.1	6.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.3		
#8	95.5		
#10	93.5		
#16	80.7		
#30	49.7		
#40	36.8		
#50	26.3		
#100	12.9		
#200	6.7		

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 1.6347 D_{85}= 1.3427 D_{60}= 0.7495
D_{50}= 0.6047 D_{30}= 0.3423 D_{15}= 0.1746
D_{10}= 0.1152 C_u= 6.51 C_c= 1.36

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

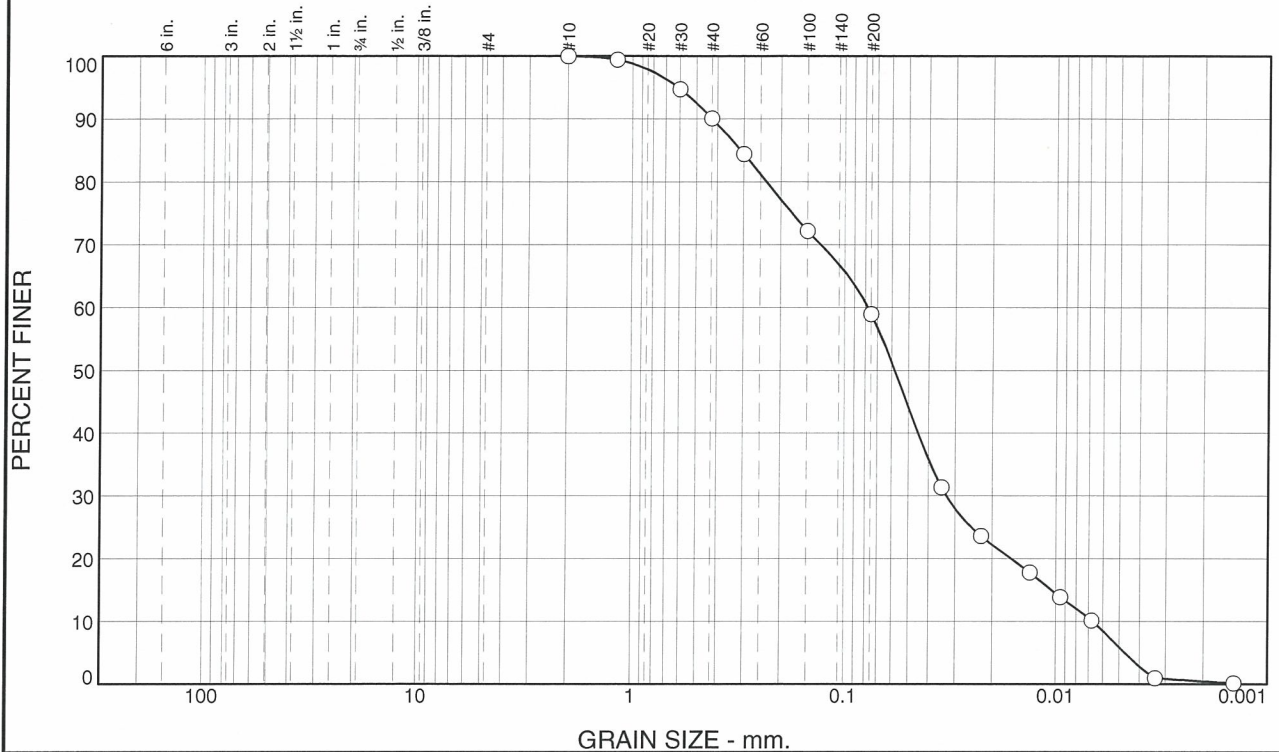Location: S0010R, S13

Sample Number: S35572   Depth: 40-41.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
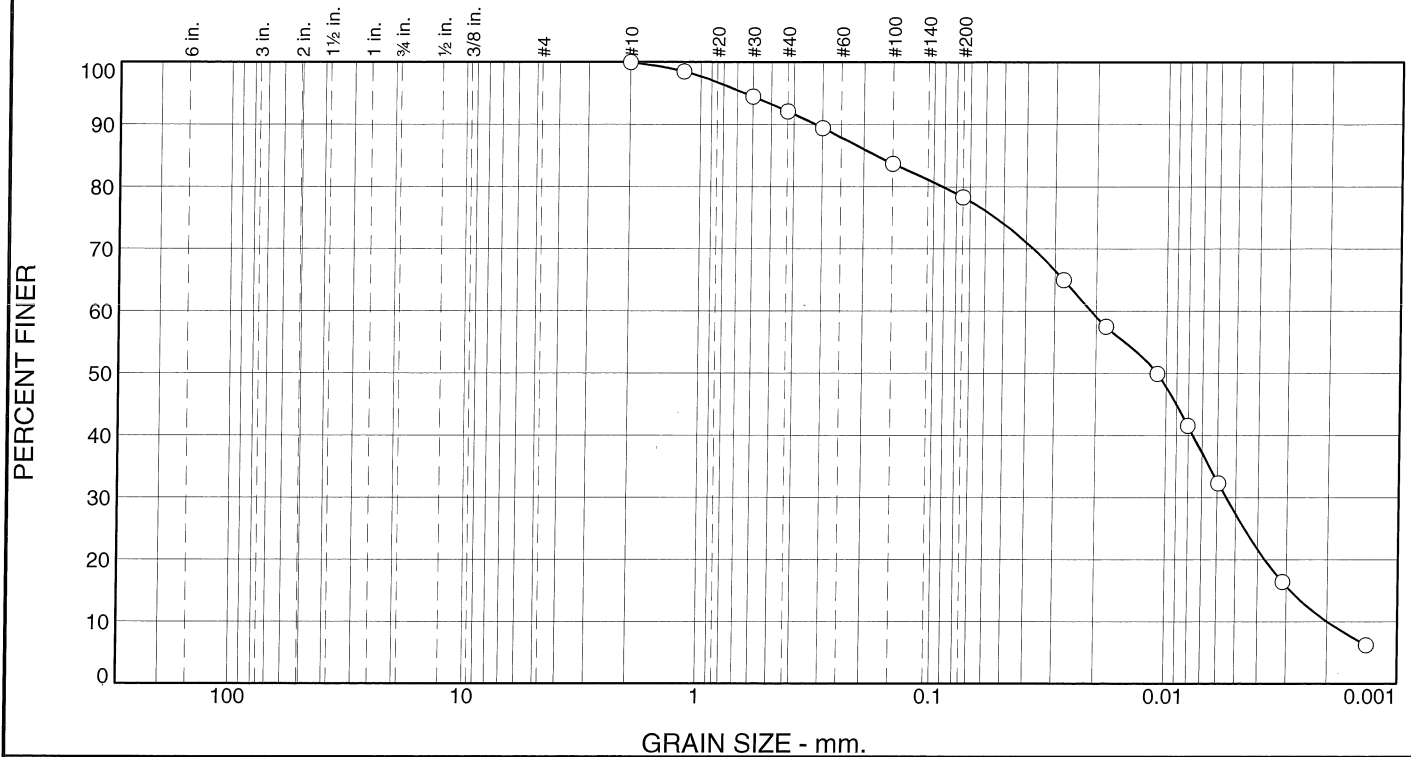
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.9	13.8	51.0	27.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	98.5		
#30	94.5		
#40	92.1		
#50	89.4		
#100	83.7		
#200	78.3		
0.0276 mm.	65.0		
0.0182 mm.	57.5		
0.0109 mm.	50.0		
0.0081 mm.	41.6		
0.0060 mm.	32.3		
0.0031 mm.	16.4		
0.0014 mm.	6.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 24   LL= 41   PI= 17

Classification

USCS (D 2487)= CL   AASHTO (M 145)= A-7-6(13)

Coefficients

D_{90}= 0.3226 D_{85}= 0.1767 D_{60}= 0.0211
D_{50}= 0.0110 D_{30}= 0.0055 D_{15}= 0.0029
D_{10}= 0.0020 C_u= 10.56 C_c= 0.72

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: js/ac
Checked By: js
Title: PM

Location: S0010R, S16
Sample Number: S35575   Depth: 55-56.5

Date Sampled:

SIERRA TESTING LABS, INC.
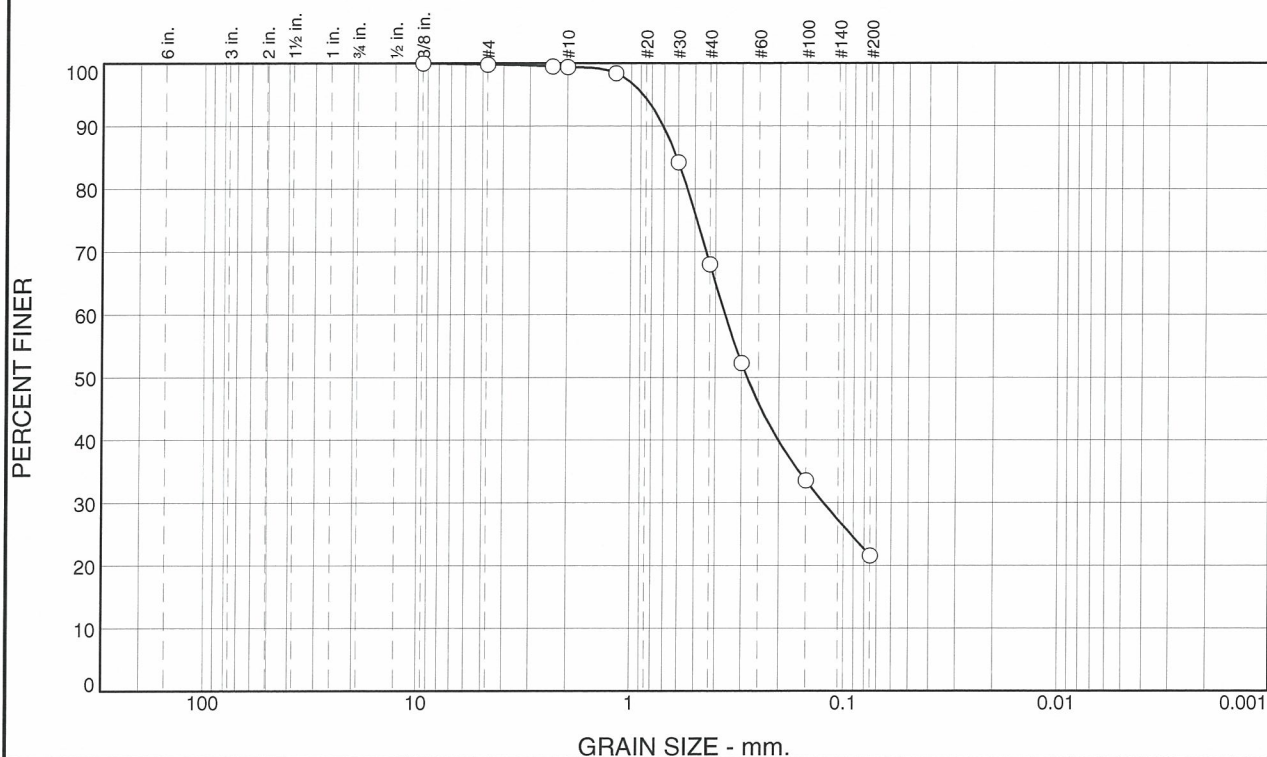## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
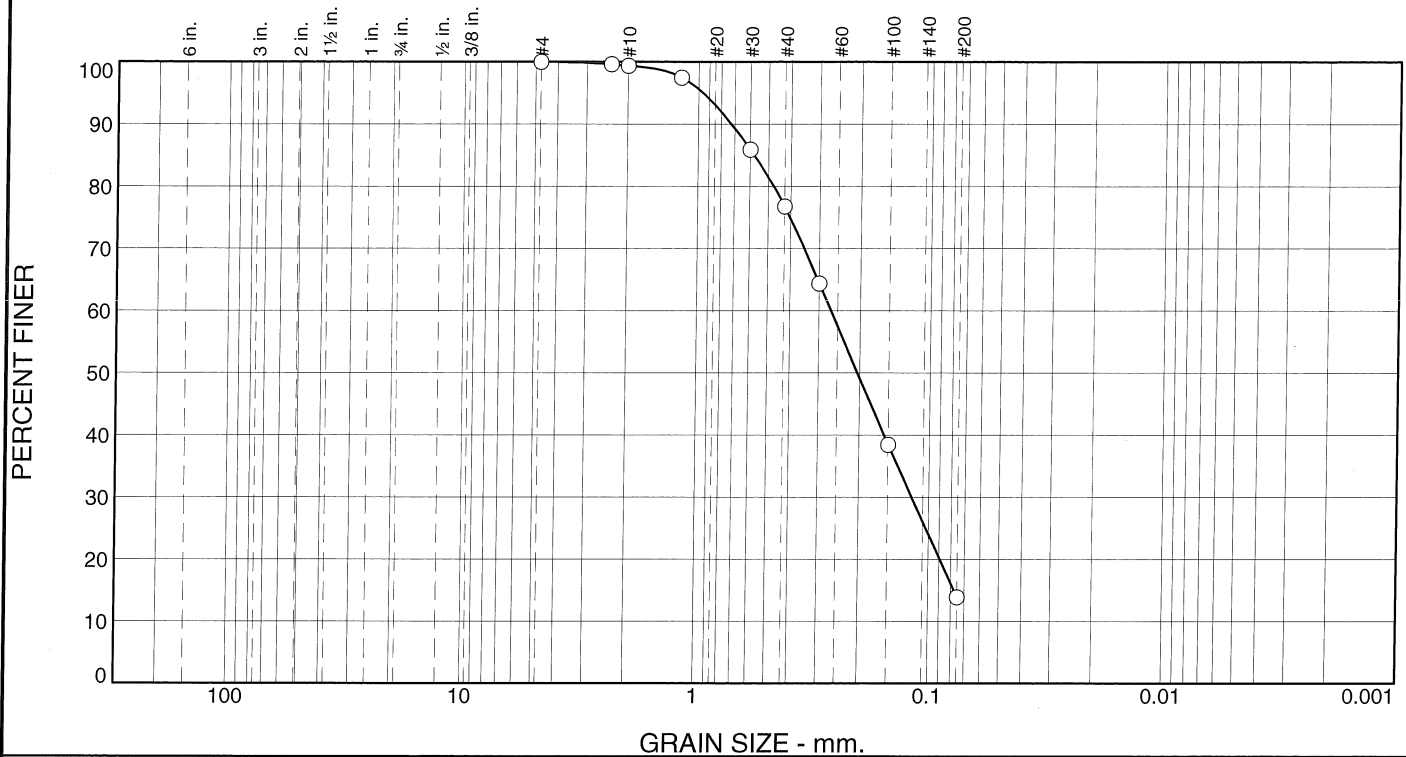
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	22.6	62.9	13.9	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.4		
#16	97.5		
#30	85.9		
#40	76.8		
#50	64.4		
#100	38.5		
#200	13.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7223 D_{85}= 0.5767 D_{60}= 0.2668
D_{50}= 0.2046 D_{30}= 0.1186 D_{15}= 0.0774
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0010R, S25
Sample Number: S35581   Depth: 100-101.3
Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP·
Project: CA High Speed Train .
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
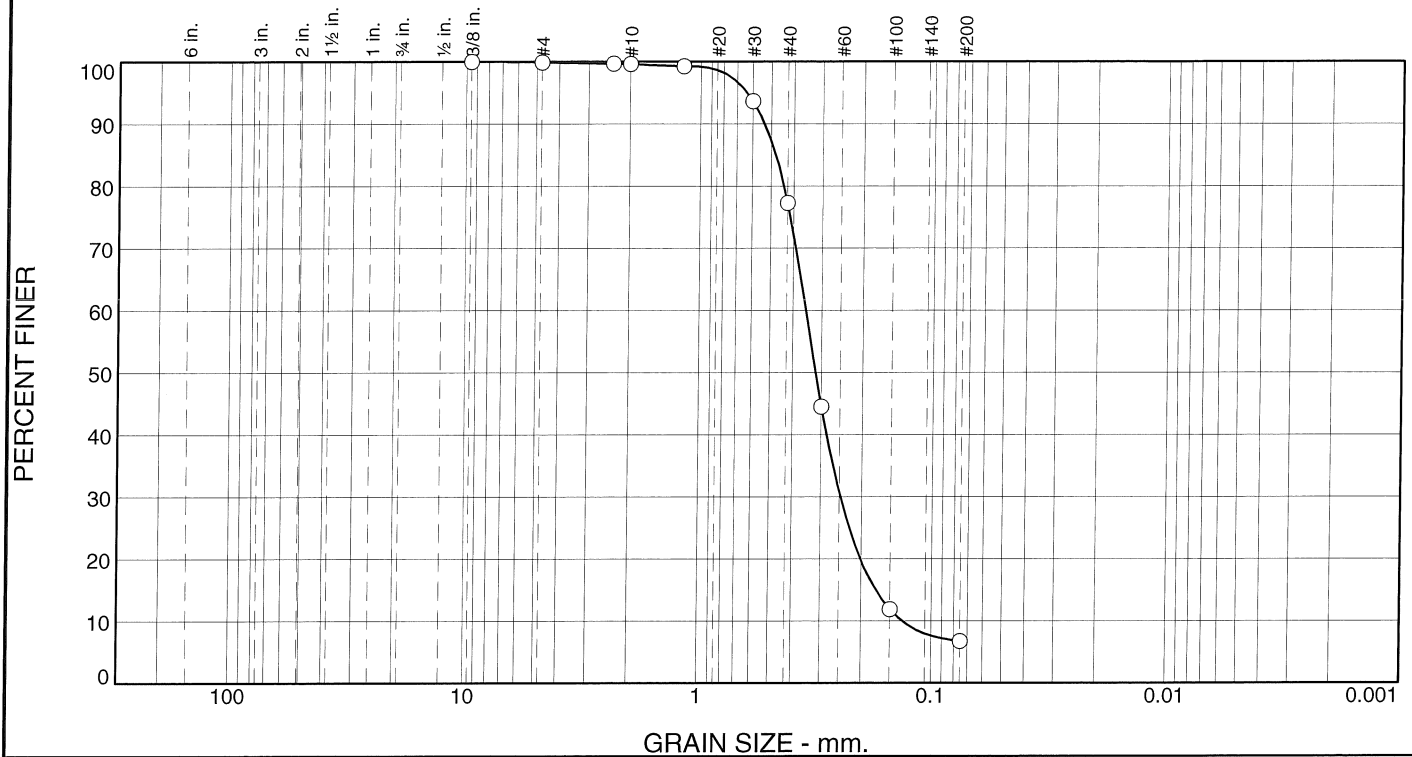
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.3	22.3	70.5	6.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.9		
#8	99.7		
#10	99.6		
#16	99.3		
#30	93.6		
#40	77.3		
#50	44.5		
#100	11.9		
#200	6.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.5337 D_{85}= 0.4781 D_{60}= 0.3520
D_{50}= 0.3182 D_{30}= 0.2468 D_{15}= 0.1727
D_{10}= 0.1327 C_u= 2.65 C_c= 1.30

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S12
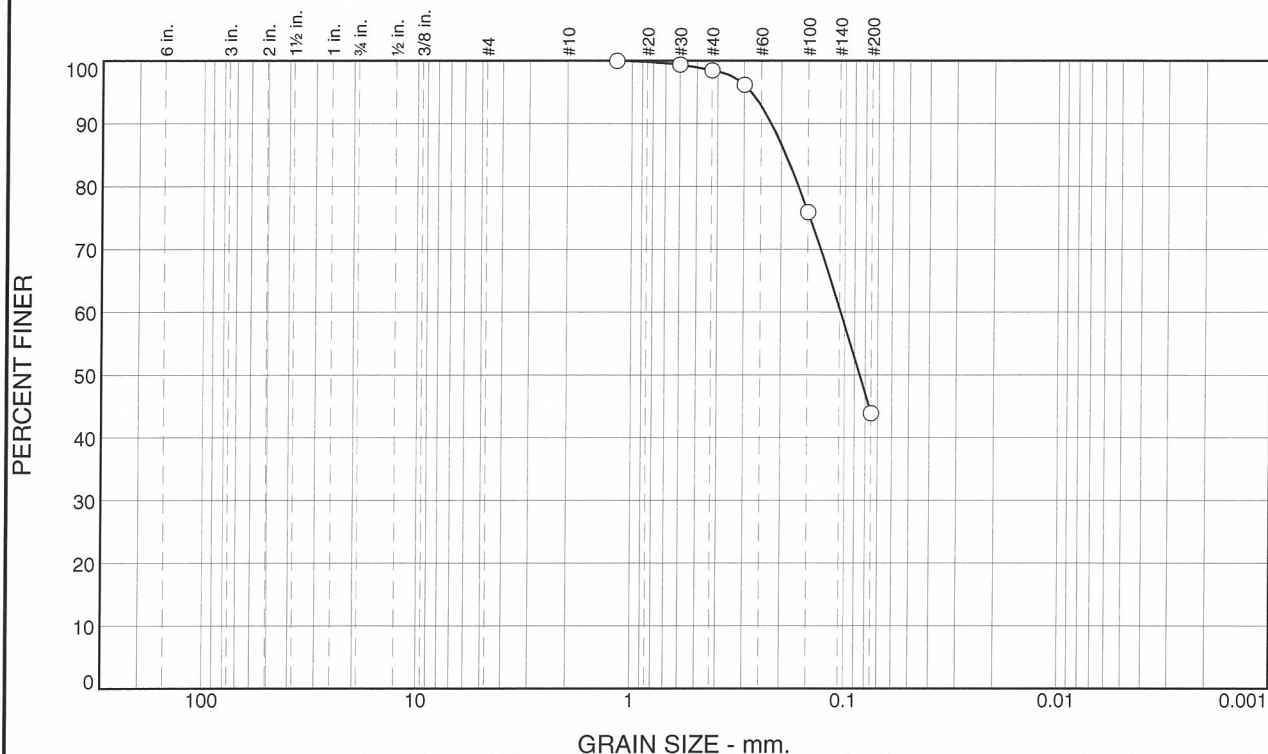Sample Number: S35592   Depth: 35-36.2   Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
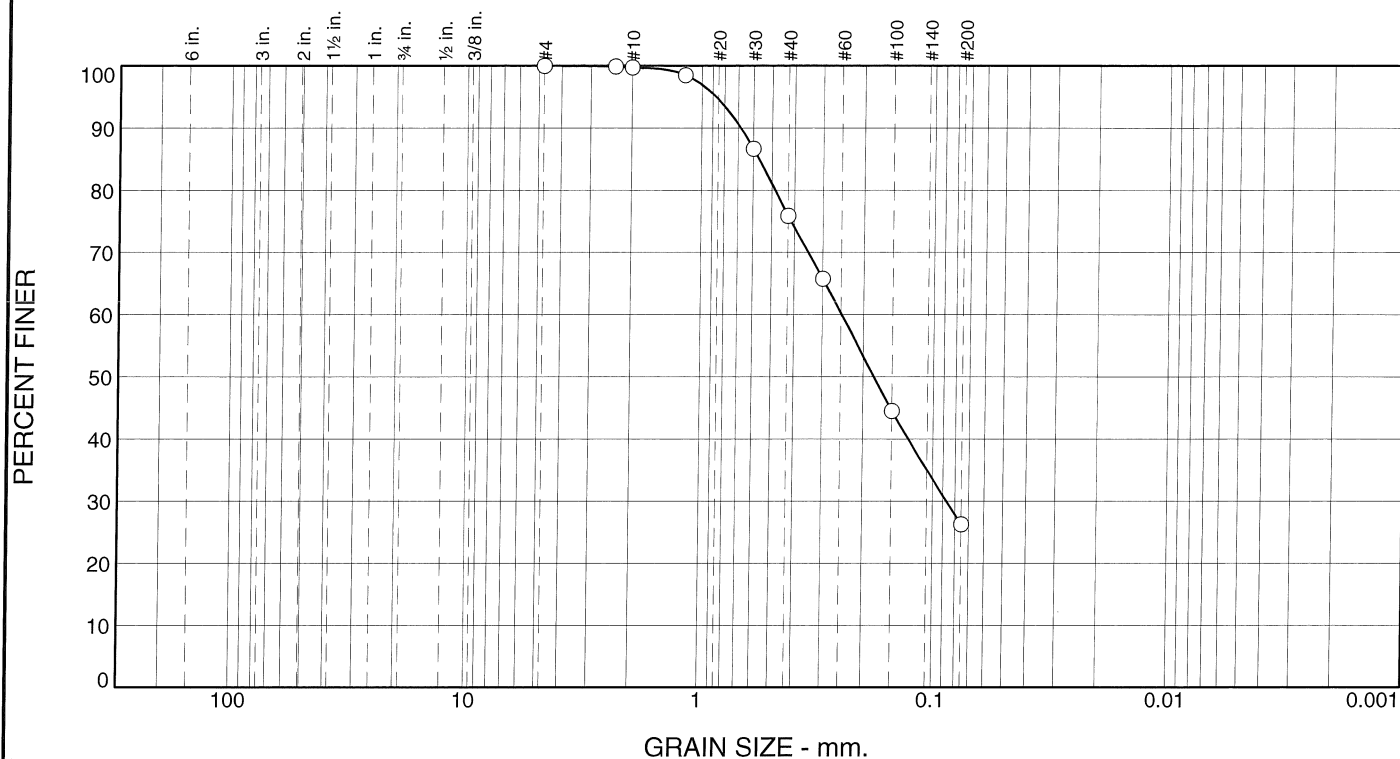
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	23.8	49.6	26.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.7		
#16	98.5		
#30	86.7		
#40	75.9		
#50	65.8		
#100	44.6		
#200	26.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.6798 D_{85}= 0.5663 D_{60}= 0.2477
D_{50}= 0.1797 D_{30}= 0.0870 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S13

Sample Number: S35593   **Depth:** 40-41.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
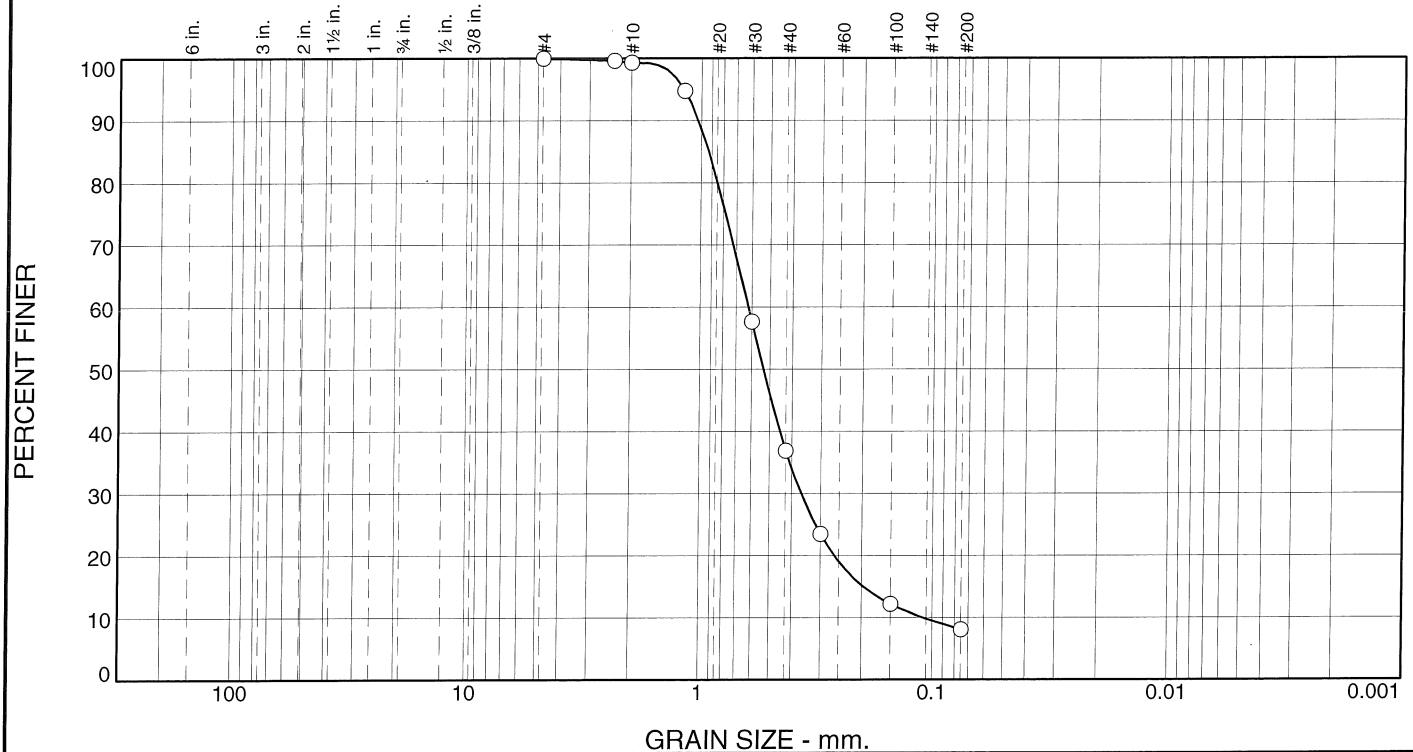
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	62.4	28.8	8.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.3		
#16	94.8		
#30	57.7		
#40	36.9		
#50	23.5		
#100	12.2		
#200	8.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 1.0329 D_{85}= 0.9302 D_{60}= 0.6212
D_{50}= 0.5329 D_{30}= 0.3640 D_{15}= 0.1962
D_{10}= 0.1094 C_u= 5.68 C_c= 1.95

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S16
Sample Number: S35595   Depth: 55-56.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
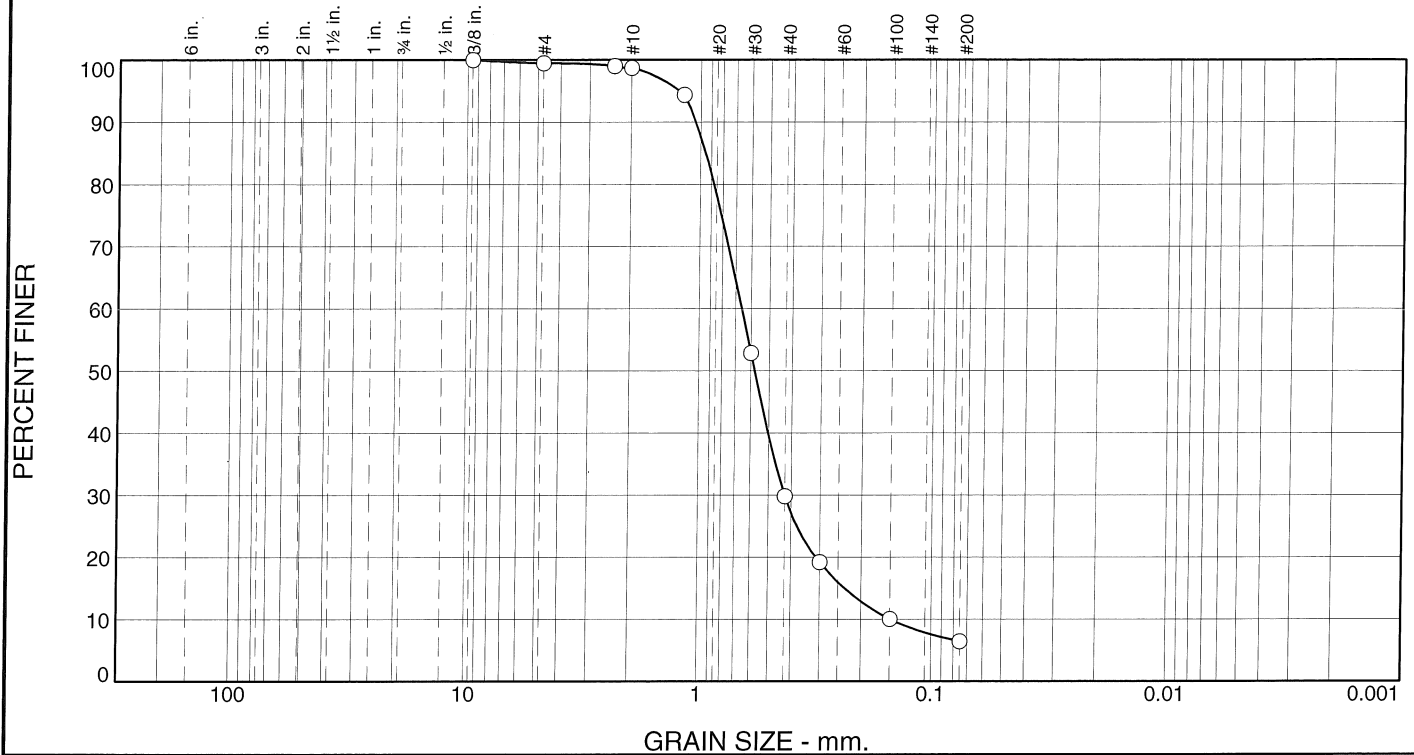
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.8	68.8	23.5	6.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.5		
#8	99.0		
#10	98.7		
#16	94.4		
#30	52.9		
#40	29.9		
#50	19.2		
#100	10.0		
#200	6.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=　　　　　LL=　　　　　PI=

Classification

USCS (D 2487)=　　　　AASHTO (M 145)=

Coefficients

D_{90}= 1.0518　　D_{85}= 0.9525　　D_{60}= 0.6589
D_{50}= 0.5775　　D_{30}= 0.4262　　D_{15}= 0.2345
D_{10}= 0.1496　　C_u= 4.40　　C_c= 1.84

Remarks

Date Received: 11/1/11　　Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S17
Sample Number: S35596　　Depth: 60-61.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　Figure

Particle Size Distribution Report
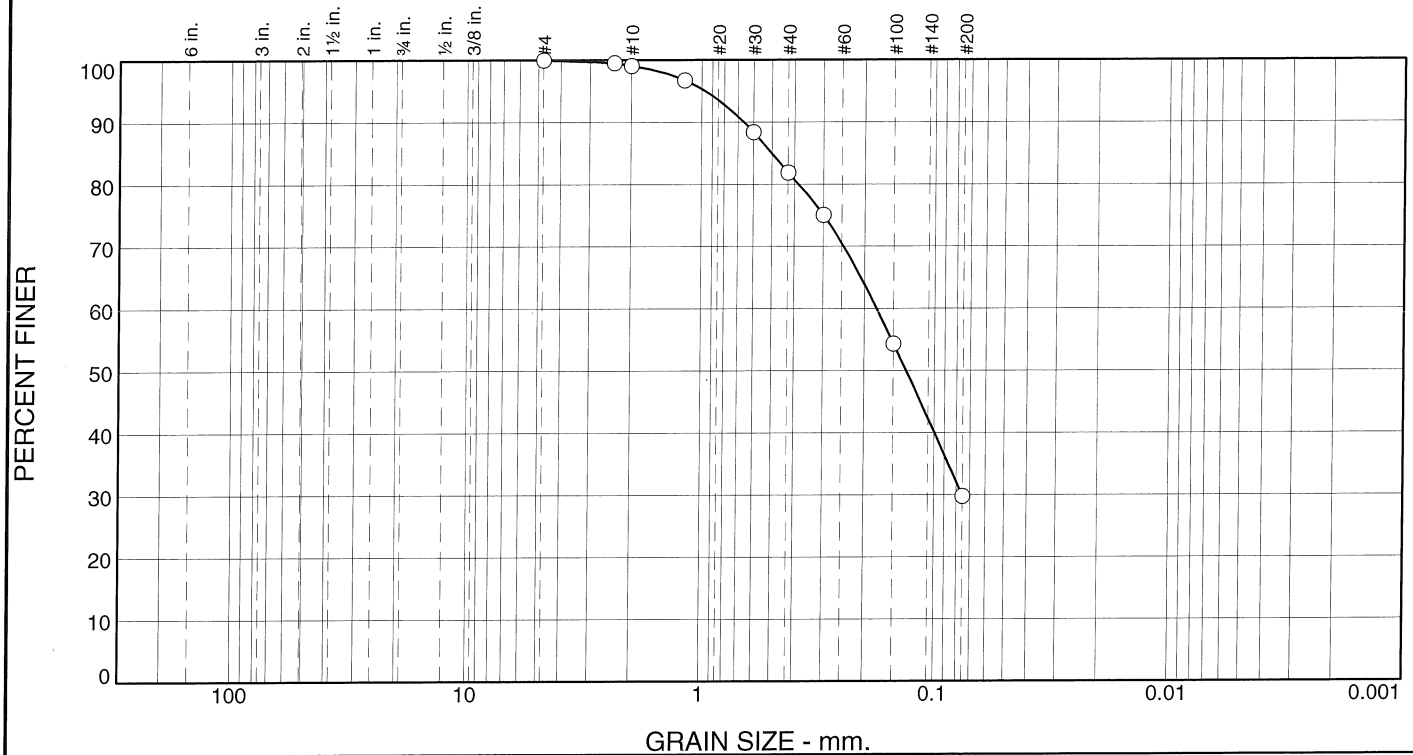
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.9	17.2	52.1	29.8	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.5		
#10	99.1		
#16	96.8		
#30	88.4		
#40	81.9		
#50	75.1		
#100	54.4		
#200	29.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.6608 D_{85}= 0.5002 D_{60}= 0.1773
D_{50}= 0.1323 D_{30}= 0.0754 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S28
Sample Number: S35605   Depth: 115-116.5

Date Sampled:

**SIERRA TESTING LABS, INC.
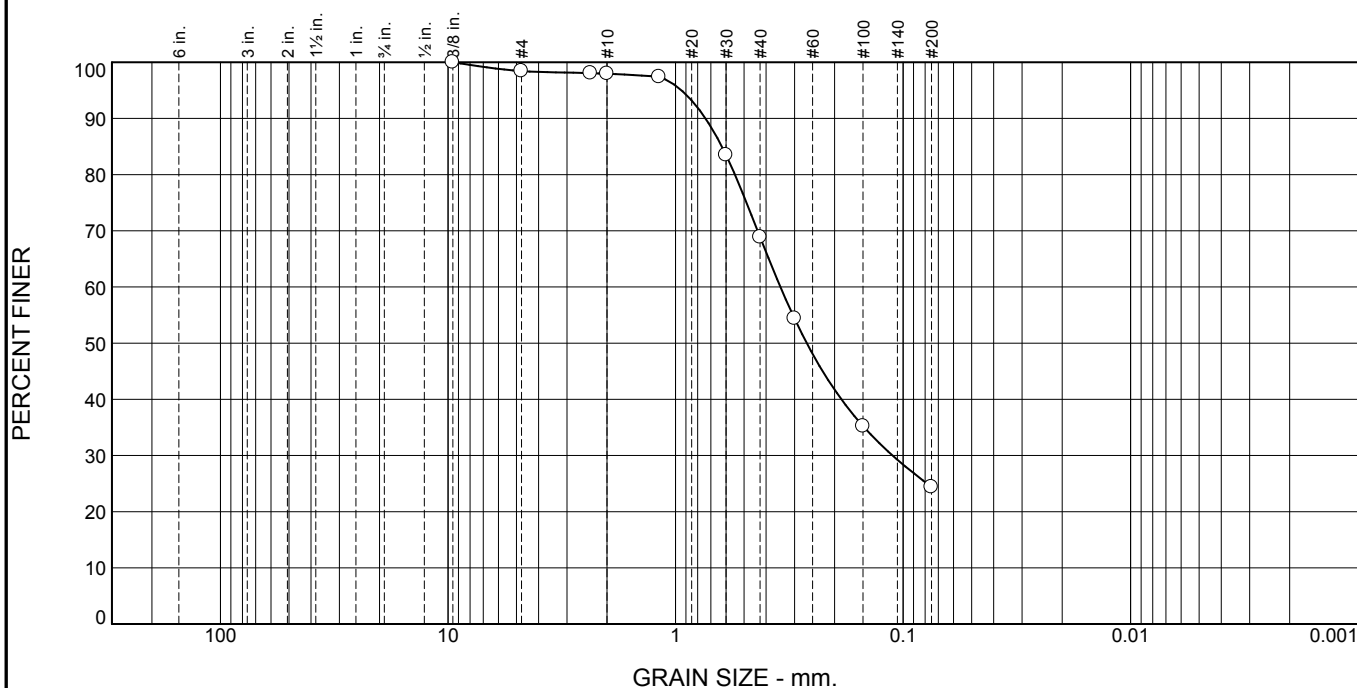El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.7	8.8	76.2	10.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.6		
#30	97.1		
#40	95.3		
#50	93.2		
#100	89.8		
#200	86.5		
0.0300 mm.	67.9		
0.0196 mm.	59.8		
0.0121 mm.	41.5		
0.0081 mm.	30.4		
0.0065 mm.	19.3		
0.0033 mm.	5.5		
0.0014 mm.	0.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 30   LL= 40   PI= 10

Classification
USCS (D 2487)= ML   AASHTO (M 145)= A-4(10)

Coefficients
D_{90}= 0.1627 D_{85}= 0.0678 D_{60}= 0.0198
D_{50}= 0.0152 D_{30}= 0.0081 D_{15}= 0.0059
D_{10}= 0.0049 C_u= 4.02 C_c= 0.67

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: js/ac
Checked By: cw
Title: pm

Location: S0012R, S33
Sample Number: S35608   Depth: 140-141.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
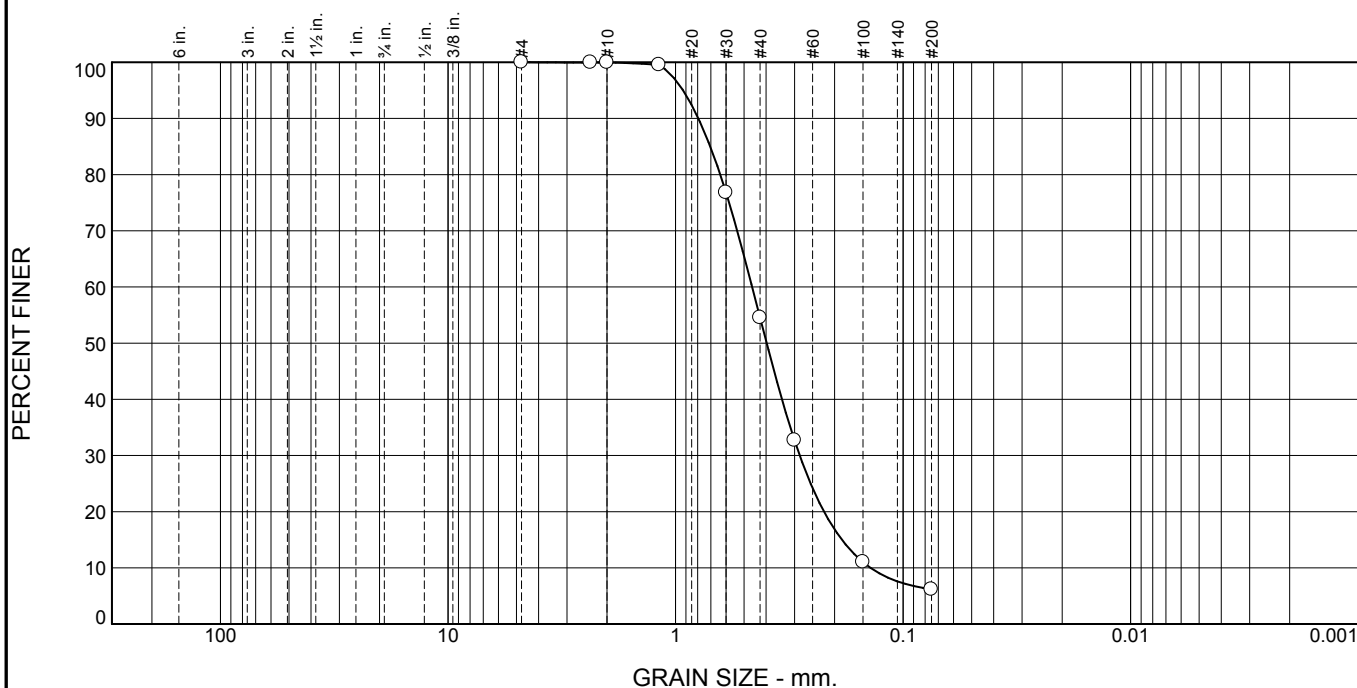Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	4.2	36.5	39.8	19.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.9		
#8	97.2		
#10	95.7		
#16	87.6		
#30	70.0		
#40	59.2		
#50	46.7		
#100	28.4		
#200	19.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 1.3328 D_{85}= 1.0471 D_{60}= 0.4349
D_{50}= 0.3291 D_{30}= 0.1629 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0013AR, S19

Sample Number: S35620   **Depth:** 70-71.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

PERCENT FINER (y-axis)

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	9.9	31.2	53.0	5.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.4		
#30	94.7		
#40	90.1		
#50	84.4		
#100	72.2		
#200	58.9		
0.0347 mm.	31.4		
0.0226 mm.	23.7		
0.0133 mm.	17.8		
0.0095 mm.	13.9		
0.0068 mm.	10.2		
0.0034 mm.	1.0		
0.0014 mm.	0.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.4228 D_{85}= 0.3100 D_{60}= 0.0778
D_{50}= 0.0581 D_{30}= 0.0329 D_{15}= 0.0105
D_{10}= 0.0067 C_u= 11.62 C_c= 2.08

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ns/ac

Checked By: cw

Title: PM

Location: S0014AR, S07
Sample Number: S35644   Depth: 12.5-13.8
Date Sampled:

SIERRA TESTING LABS, INC.
**El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

Grain size distribution curve plotted on GRAIN SIZE - mm (x-axis, from 100 to 0.001) versus PERCENT FINER (y-axis, 0 to 100). Sieve sizes marked: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.4	31.4	46.4	21.6	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.8		
#8	99.5		
#10	99.4		
#16	98.4		
#30	84.2		
#40	68.0		
#50	52.3		
#100	33.6		
#200	21.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7097 D_{85}= 0.6120 D_{60}= 0.3596
D_{50}= 0.2823 D_{30}= 0.1237 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: pm

Location: S0014AR, S08
Sample Number: S35645   **Depth:** 14-15.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
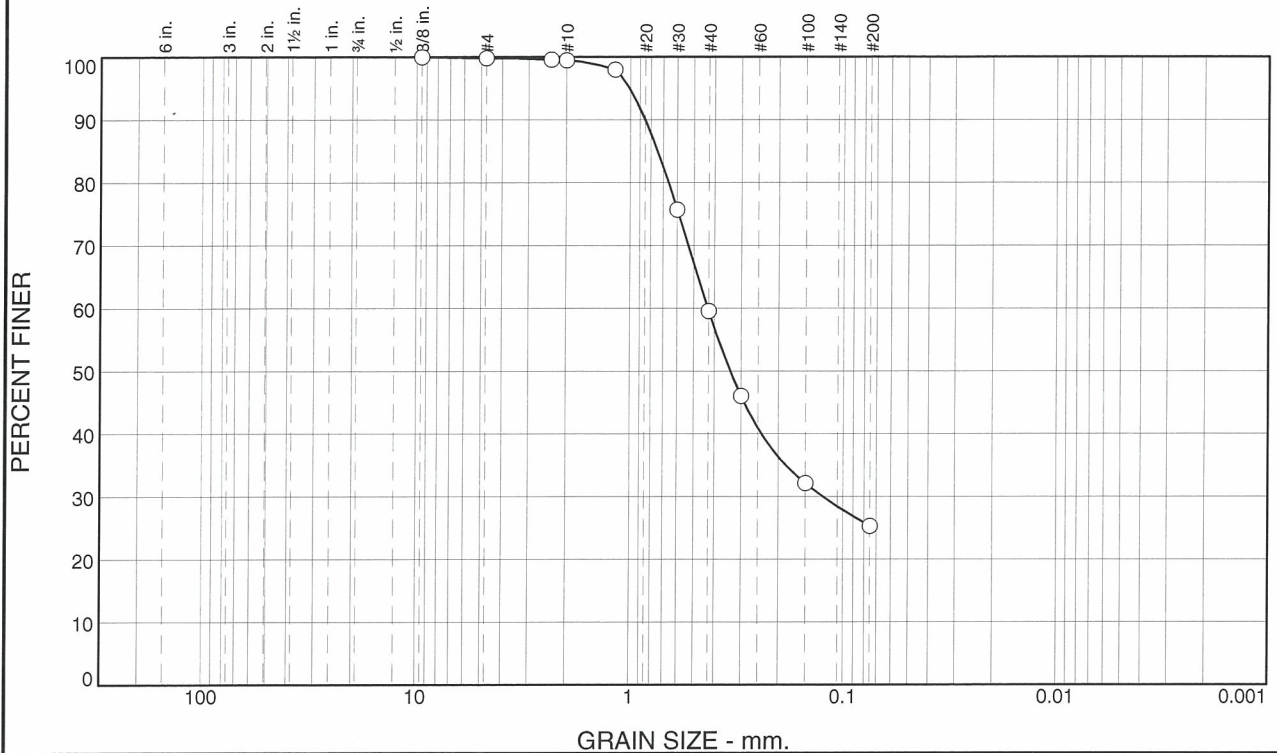
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.3	39.9	34.3	25.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.8		
#8	99.6		
#10	99.5		
#16	98.0		
#30	75.7		
#40	59.6		
#50	46.0		
#100	32.2		
#200	25.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.8528 D_{85}= 0.7444 D_{60}= 0.4292
D_{50}= 0.3368 D_{30}= 0.1240 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014AR, S10
**Sample Number:** S35646   **Depth:** 25-26.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
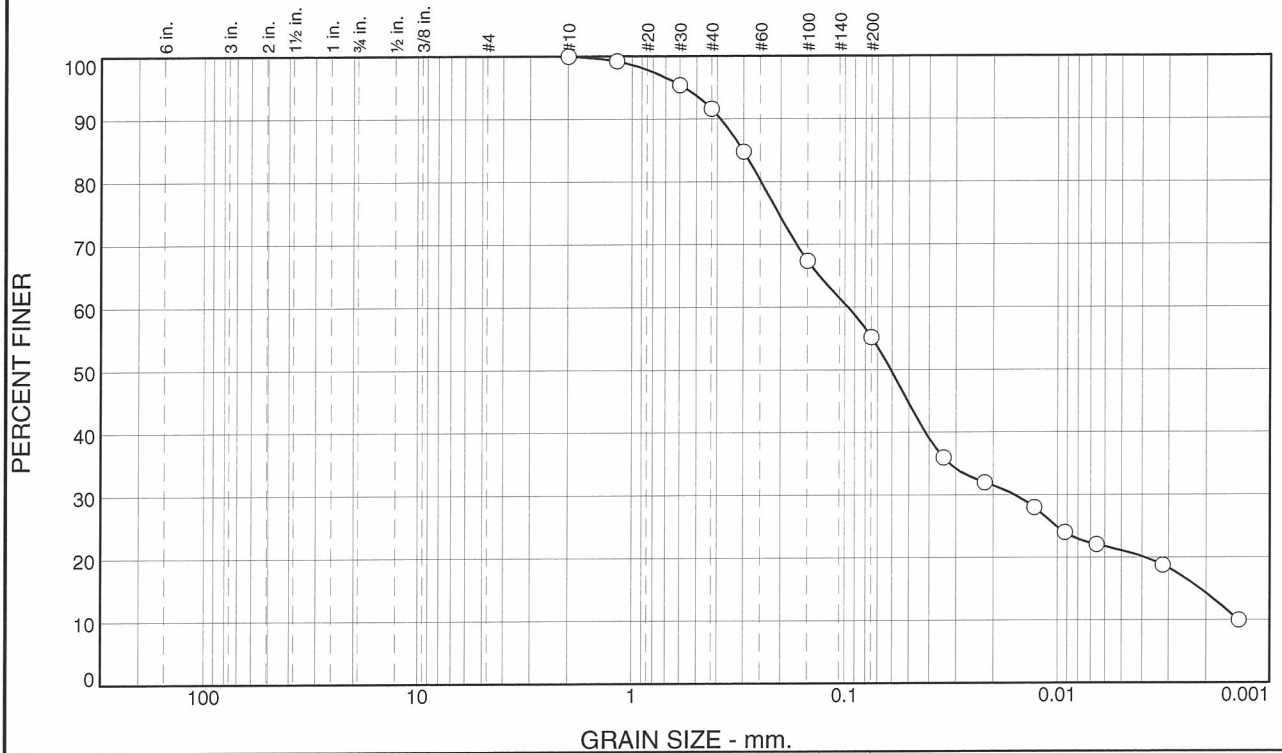
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	8.4	36.4	34.1	21.1

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.2		
#30	95.4		
#40	91.6		
#50	84.8		
#100	67.4		
#200	55.2		
0.0343 mm.	36.0		
0.0220 mm.	32.0		
0.0129 mm.	28.0		
0.0092 mm.	24.0		
0.0066 mm.	22.1		
0.0032 mm.	18.8		
0.0014 mm.	10.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 11   LL= 28   PI= 17

Classification

USCS (D 2487)= CL   AASHTO (M 145)= A-6(6)

Coefficients

D_{90}= 0.3852 D_{85}= 0.3026 D_{60}= 0.0970
D_{50}= 0.0608 D_{30}= 0.0159 D_{15}= 0.0021
D_{10}= 0.0014 C_u= 69.35 C_c= 1.86

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ns/ac

Checked By: cw

Title: pm

Location: S0014AR, S14
Sample Number: S35649   Depth: 45-46.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

PERCENT FINER

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.5	54.6	43.9	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#16	100.0		
#30	99.4		
#40	98.5		
#50	96.2		
#100	75.9		
#200	43.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.2238 D_{85}= 0.1907 D_{60}= 0.1048
D_{50}= 0.0850 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S10   Date Sampled:
Sample Number: S35633   Depth: 25-26.4

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
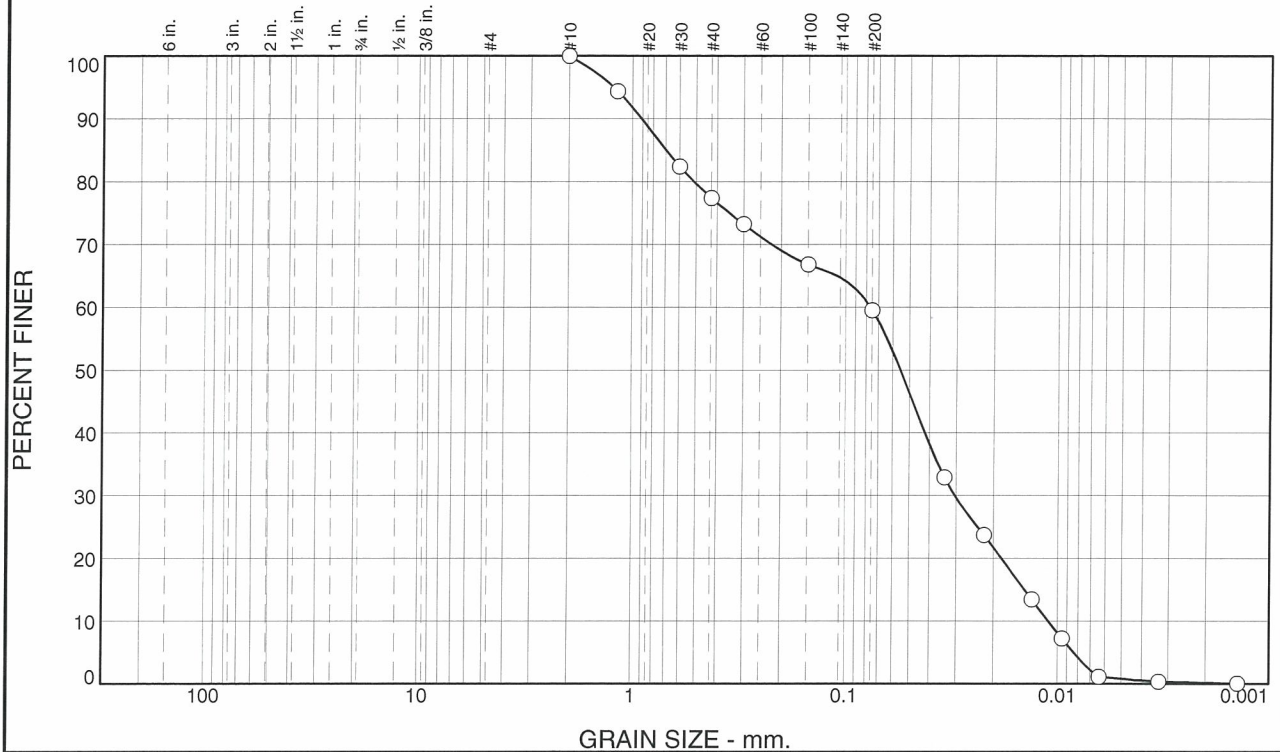
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	22.6	17.9	58.7	0.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	94.4		
#30	82.4		
#40	77.4		
#50	73.2		
#100	66.8		
#200	59.5		
0.0341 mm.	32.9		
0.0222 mm.	23.7		
0.0132 mm.	13.5		
0.0095 mm.	7.3		
0.0064 mm.	1.2		
0.0033 mm.	0.4		
0.0014 mm.	0.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 31   LL= 33   PI= 2

Classification

USCS (D 2487)= ML   AASHTO (M 145)= A-4(1)

Coefficients

$D_{90}= 0.9088$ $D_{85}= 0.6965$ $D_{60}= 0.0765$
$D_{50}= 0.0553$ $D_{30}= 0.0304$ $D_{15}= 0.0143$
$D_{10}= 0.0110$ $C_u= 6.93$ $C_c= 1.10$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ns/ac

Checked By: cw

Title: PM

Location: S0014R, S15
Sample Number: S35636   Depth: 50-51.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
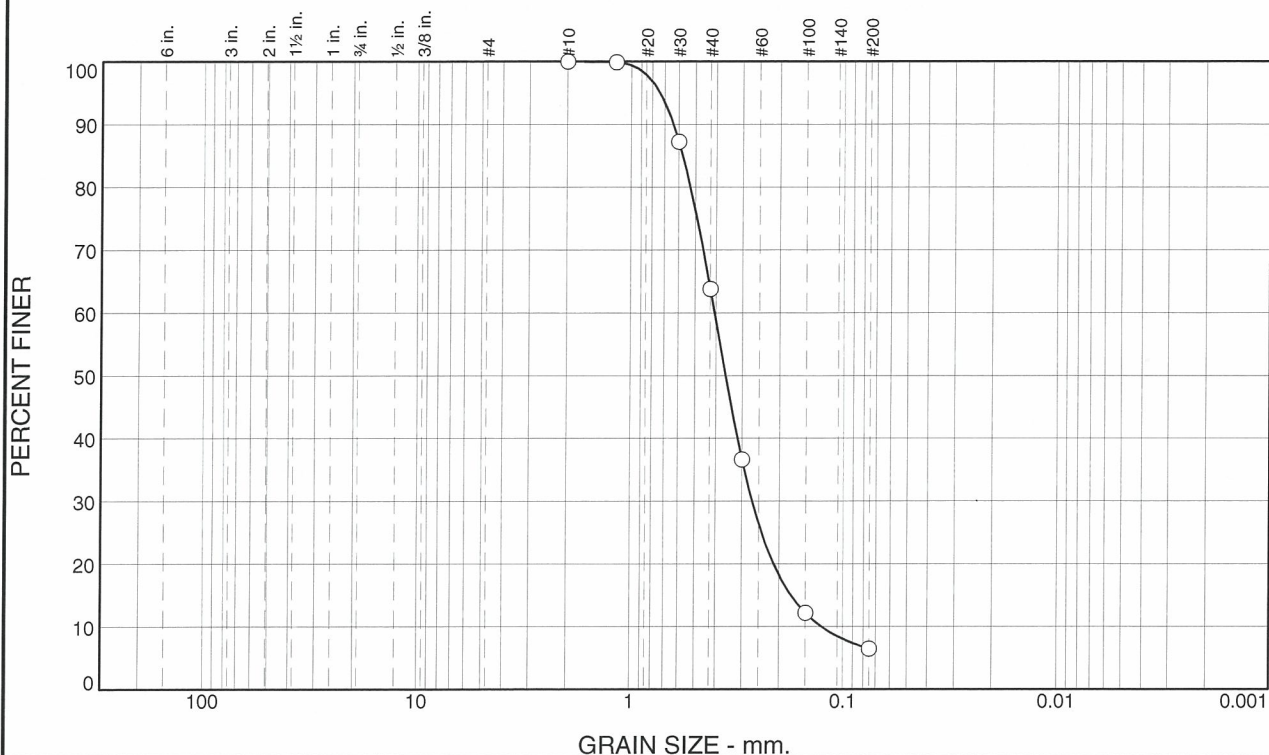
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	36.2	57.3	6.5	

TEST RESULTS (ASTM D 6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.9		
#30	87.2		
#40	63.8		
#50	36.7		
#100	12.2		
#200	6.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.6369 D_{85}= 0.5751 D_{60}= 0.4056
D_{50}= 0.3588 D_{30}= 0.2683 D_{15}= 0.1757
D_{10}= 0.1260 C_u= 3.22 C_c= 1.41

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S11A
**Sample Number:** S36291   **Depth:** 30-30.7

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	0.5	29.0	44.5	24.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	98.4		
#8	98.0		
#10	97.9		
#16	97.4		
#30	83.5		
#40	68.9		
#50	54.4		
#100	35.2		
#200	24.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
D_{90}= 0.7385　　D_{85}= 0.6261　　D_{60}= 0.3460
D_{50}= 0.2651　　D_{30}= 0.1112　　D_{15}=
D_{10}=　　　　　C_u=　　　　　C_c=

Remarks
friable particles

Date Received: 11/1/11　　**Date Tested:** 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0016R, S04
Sample Number: S35665　　**Depth:** 15-16.3

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　**Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	45.5	48.4	6.1	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.5		
#30	76.8		
#40	54.5		
#50	32.7		
#100	11.0		
#200	6.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 0.7938 D_{85}= 0.7039 D_{60}= 0.4607
D_{50}= 0.3975 D_{30}= 0.2847 D_{15}= 0.1858
D_{10}= 0.1390 C_u= 3.31 C_c= 1.27

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: stu
Checked By: cw
Title: PM

Location: S0016R, S06
Sample Number: S35667   **Depth:** 25-26.1

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
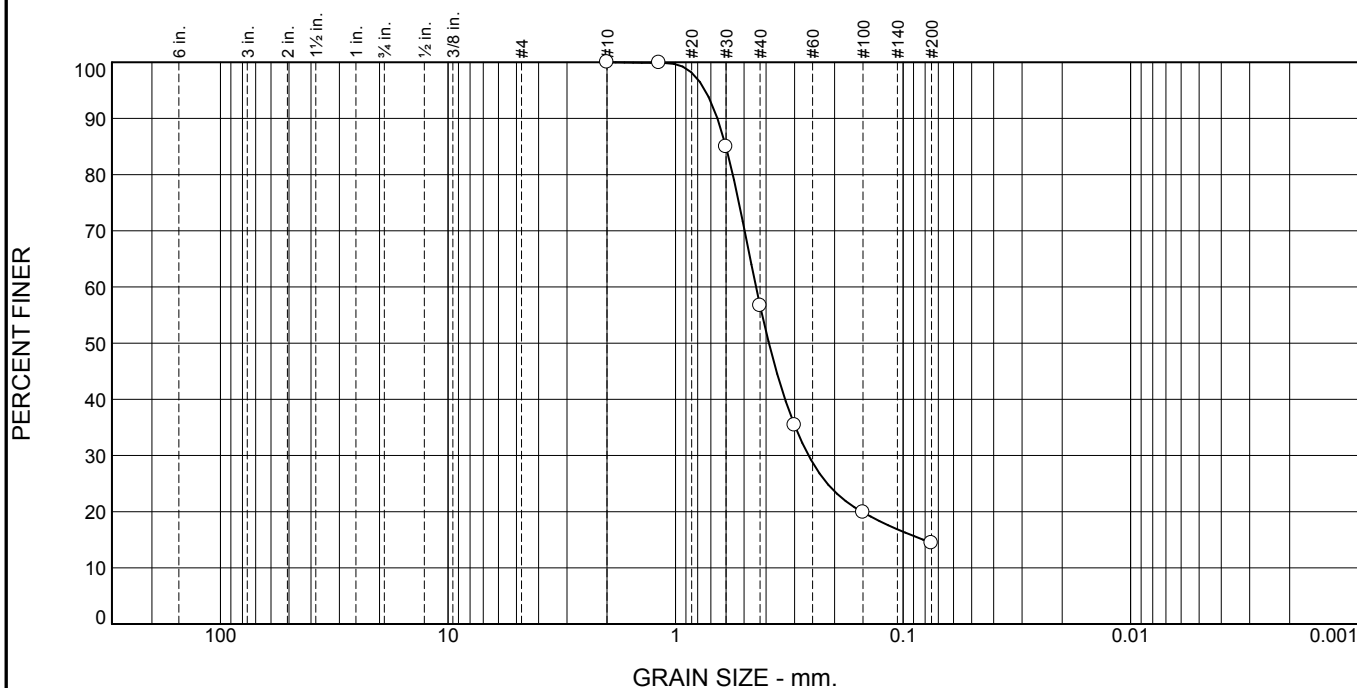
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	43.4	42.2	14.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.9		
#30	84.9		
#40	56.6		
#50	35.4		
#100	19.9		
#200	14.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D$_{90}$= 0.6547   D$_{85}$= 0.6006   D$_{60}$= 0.4428
D$_{50}$= 0.3888   D$_{30}$= 0.2603   D$_{15}$= 0.0815
D$_{10}$=   C$_u$=   C$_c$=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: stu
Checked By: cw
Title: PM

Location: S0016R, S09
**Sample Number:** S35668   **Depth:** 40-40.9

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
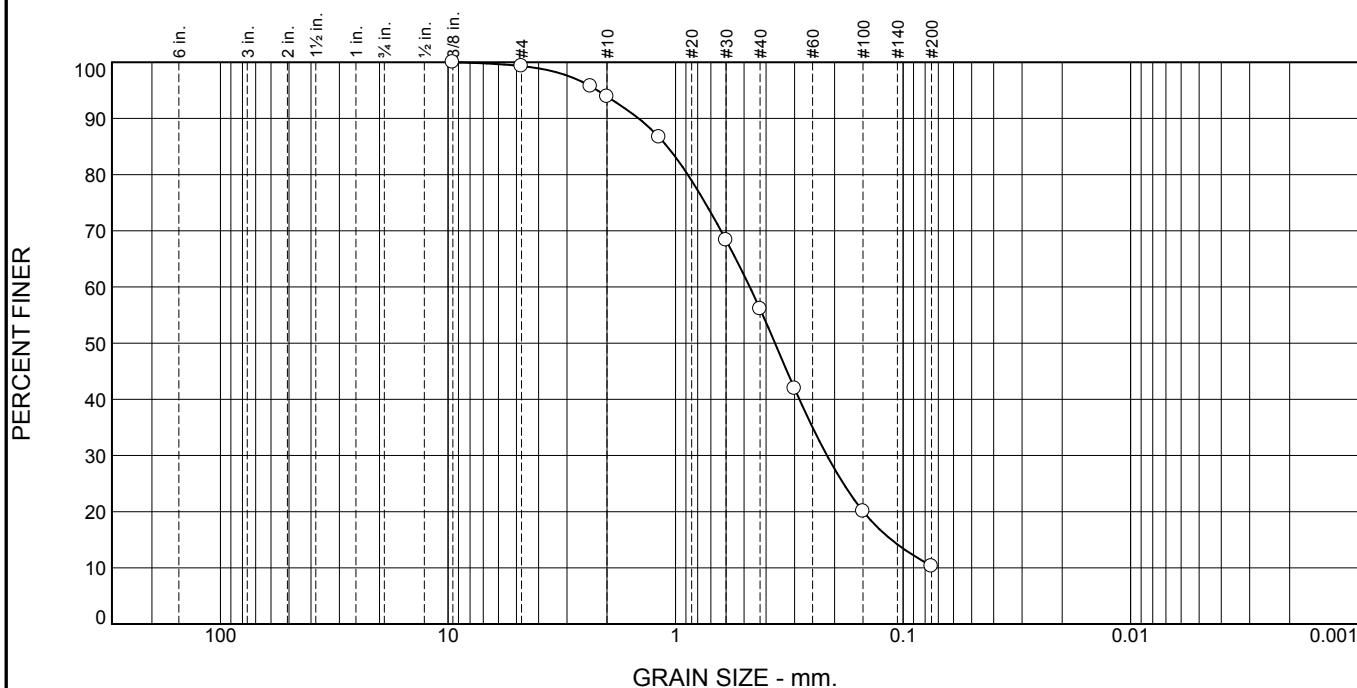
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	5.4	37.8	45.8	10.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.3		
#8	95.7		
#10	93.9		
#16	86.6		
#30	68.3		
#40	56.1		
#50	41.9		
#100	20.1		
#200	10.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 1.4530 D_{85}= 1.0876 D_{60}= 0.4716
D_{50}= 0.3655 D_{30}= 0.2160 D_{15}= 0.1125
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: stu
Checked By: cw
Title: PM

Location: S0016R, S18
Sample Number: S35675   **Depth:** 85-86.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.
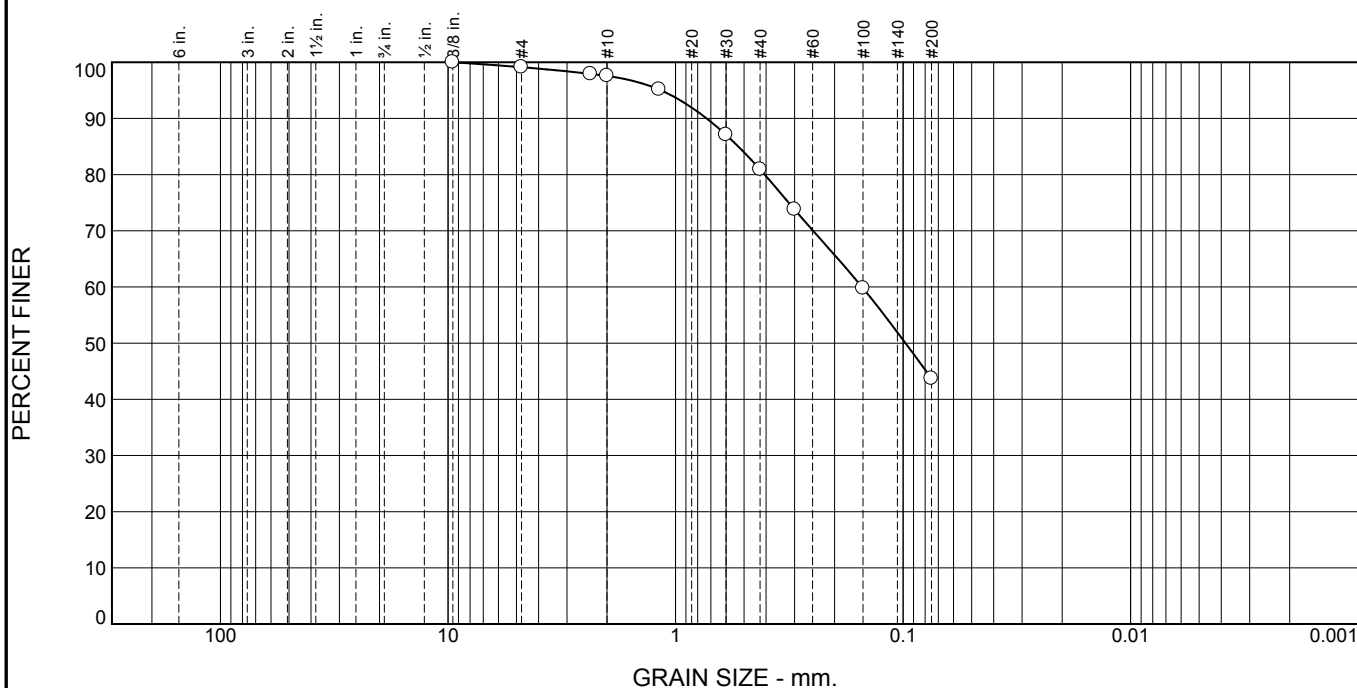
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	1.5	16.7	37.2	43.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.1		
#8	97.9		
#10	97.6		
#16	95.1		
#30	87.1		
#40	80.9		
#50	73.8		
#100	59.8		
#200	43.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= LL= PI=

Classification
USCS (D 2487)= AASHTO (M 145)=

Coefficients
D_{90}= 0.7304 D_{85}= 0.5299 D_{60}= 0.1516
D_{50}= 0.0976 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11 **Date Tested:** 11/1/11
Tested By: stu
Checked By: cw
Title: PM

Location: S0016R, S19
Sample Number: S35676 **Depth:** 90-91.5

Date Sampled:

## SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111 **Figure**

Particle Size Distribution Report
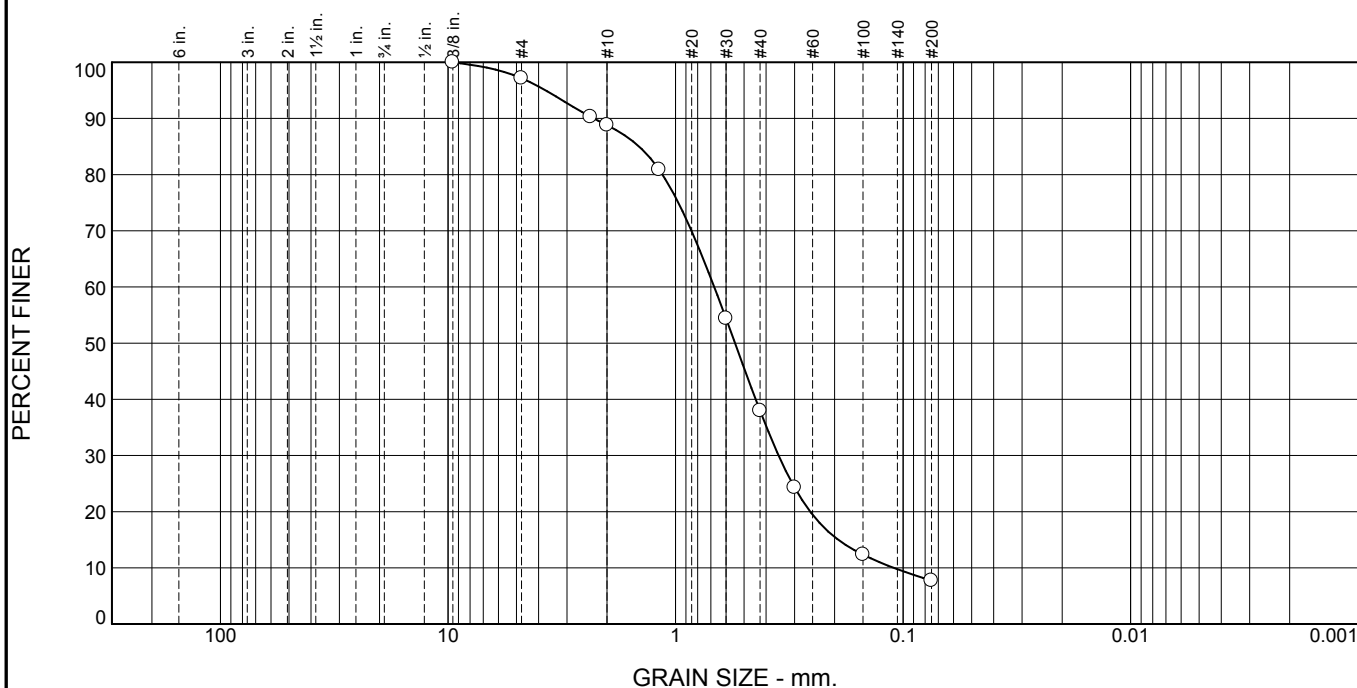
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.8	8.4	50.9	30.2	7.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	97.2		
#8	90.3		
#10	88.8		
#16	80.9		
#30	54.4		
#40	37.9		
#50	24.3		
#100	12.4		
#200	7.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= 2.2874 D_{85}= 1.4454 D_{60}= 0.6760
D_{50}= 0.5479 D_{30}= 0.3525 D_{15}= 0.1928
D_{10}= 0.1099 C_u= 6.15 C_c= 1.67

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: stu
Checked By: cw
Title: PM

Location: S0016R, S22
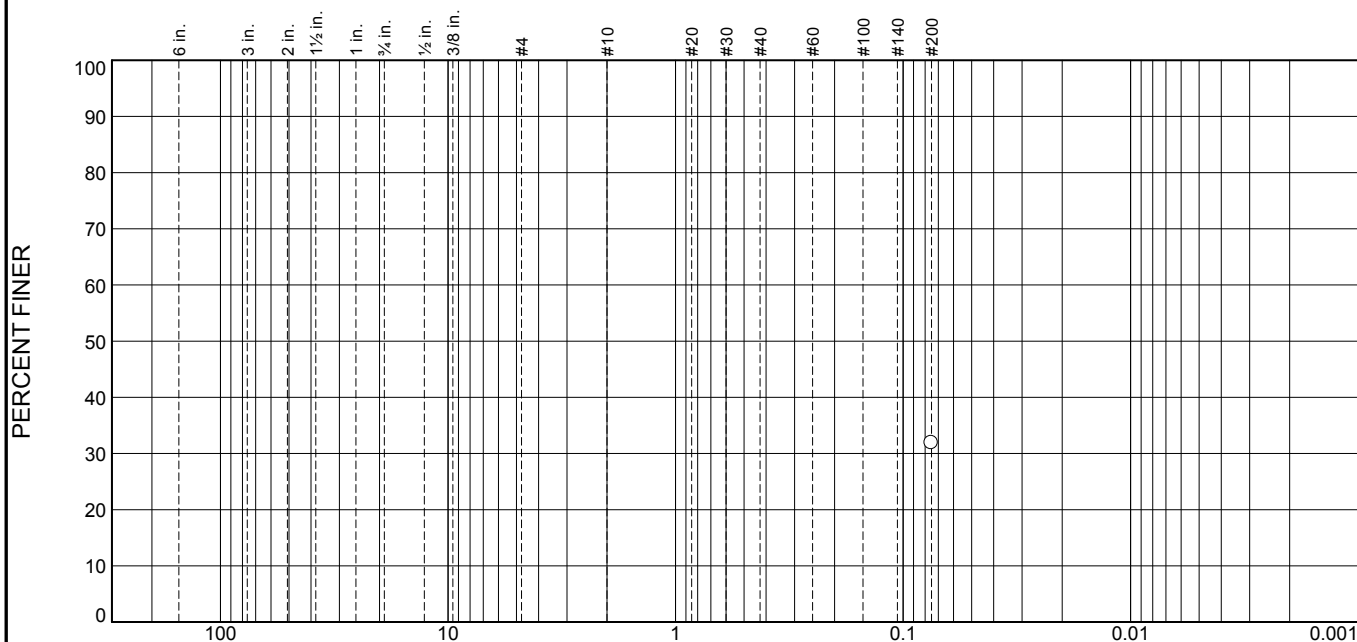**Sample Number:** S35677   **Depth:** 105-106.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
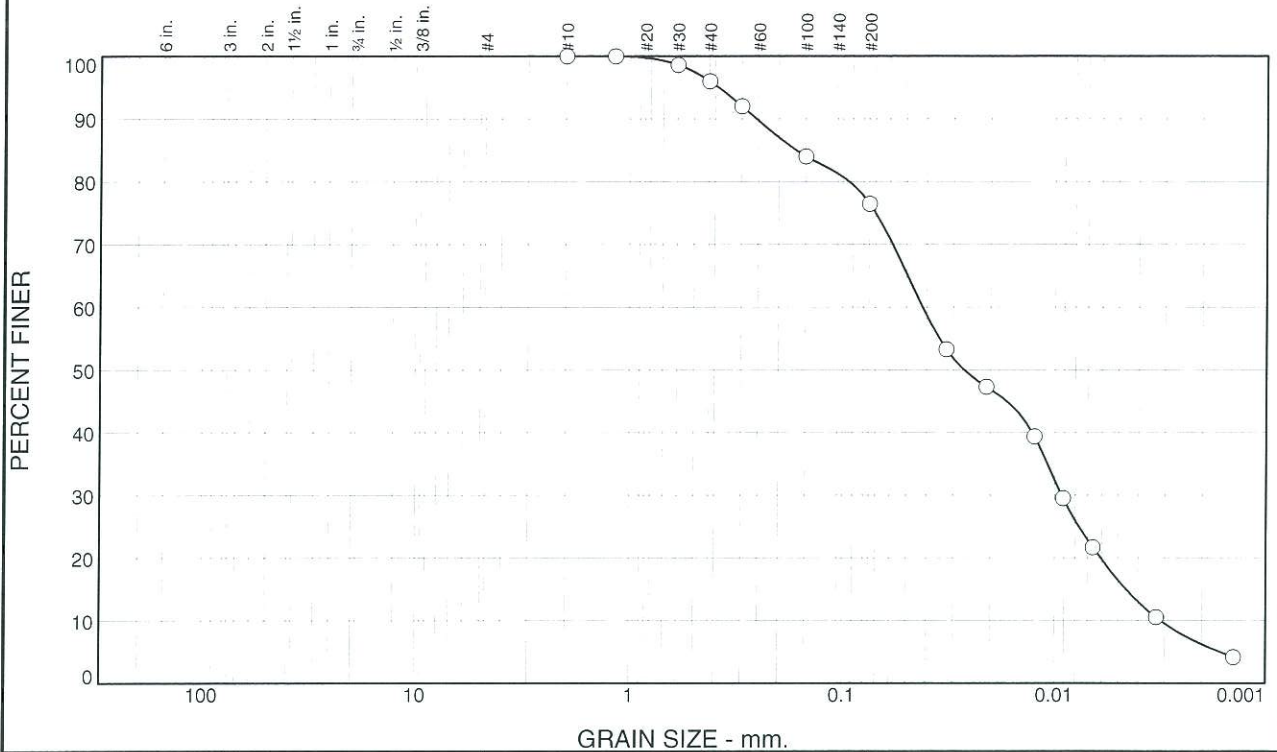
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.0	19.6	59.9	16.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	98.6		
#40	96.0		
#50	92.0		
#100	84.0		
#200	76.4		
0.0324 mm.	53.3		
0.0210 mm.	47.3		
0.0125 mm.	39.4		
0.0091 mm.	29.6		
0.0066 mm.	21.7		
0.0033 mm.	10.6		
0.0014 mm.	4.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 17   LL= 27   PI= 10

Classification
USCS (D 2487)= CL   AASHTO (M 145)= A-4(6)

Coefficients
D_{90}= 0.2558 D_{85}= 0.1665 D_{60}= 0.0420
D_{50}= 0.0267 D_{30}= 0.0093 D_{15}= 0.0046
D_{10}= 0.0031 C_u= 13.39 C_c= 0.65

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ns/ac
Checked By: cw
Title: PM

Location: S0017R, S25
Sample Number: S35696   Depth: 120-121.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
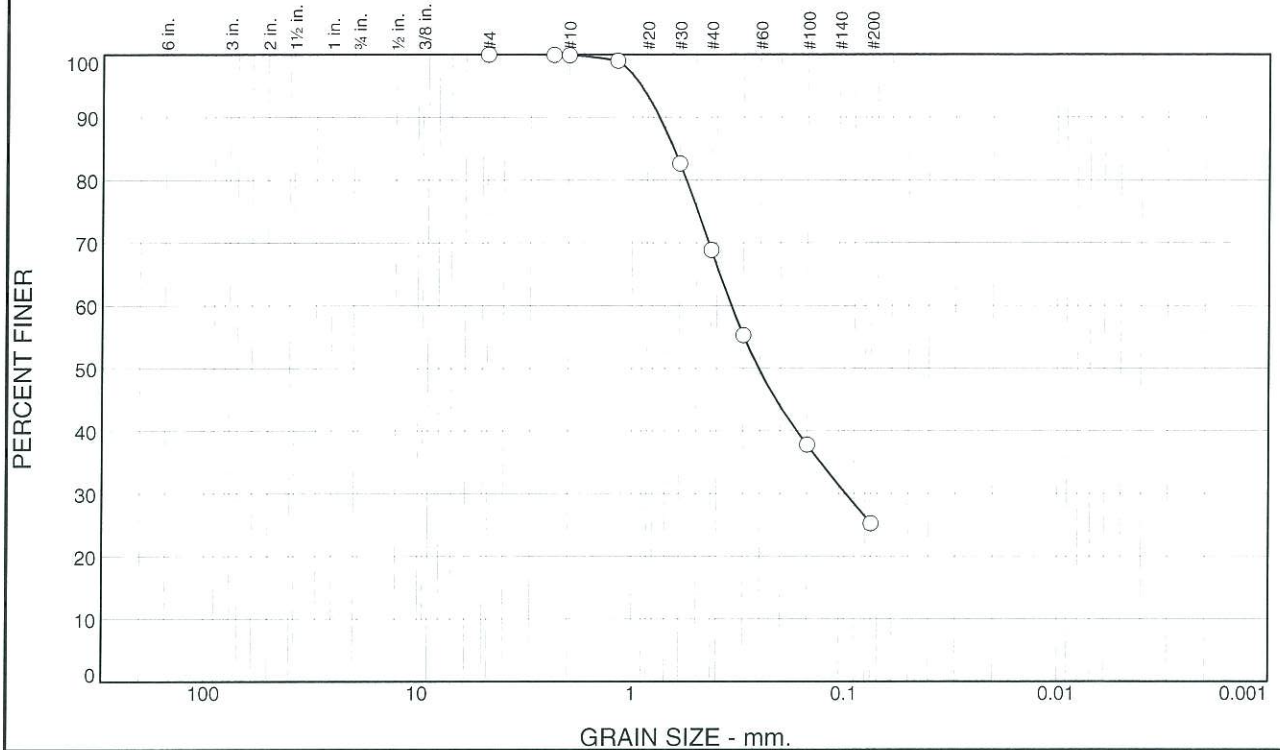
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	31.0	43.6	25.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	99.9		
#16	99.0		
#30	82.6		
#40	68.9		
#50	55.3		
#100	37.8		
#200	25.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7493 D_{85}= 0.6409 D_{60}= 0.3412
D_{50}= 0.2537 D_{30}= 0.0983 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R, S07
Sample Number: S35701   **Depth:** 30-31.2

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
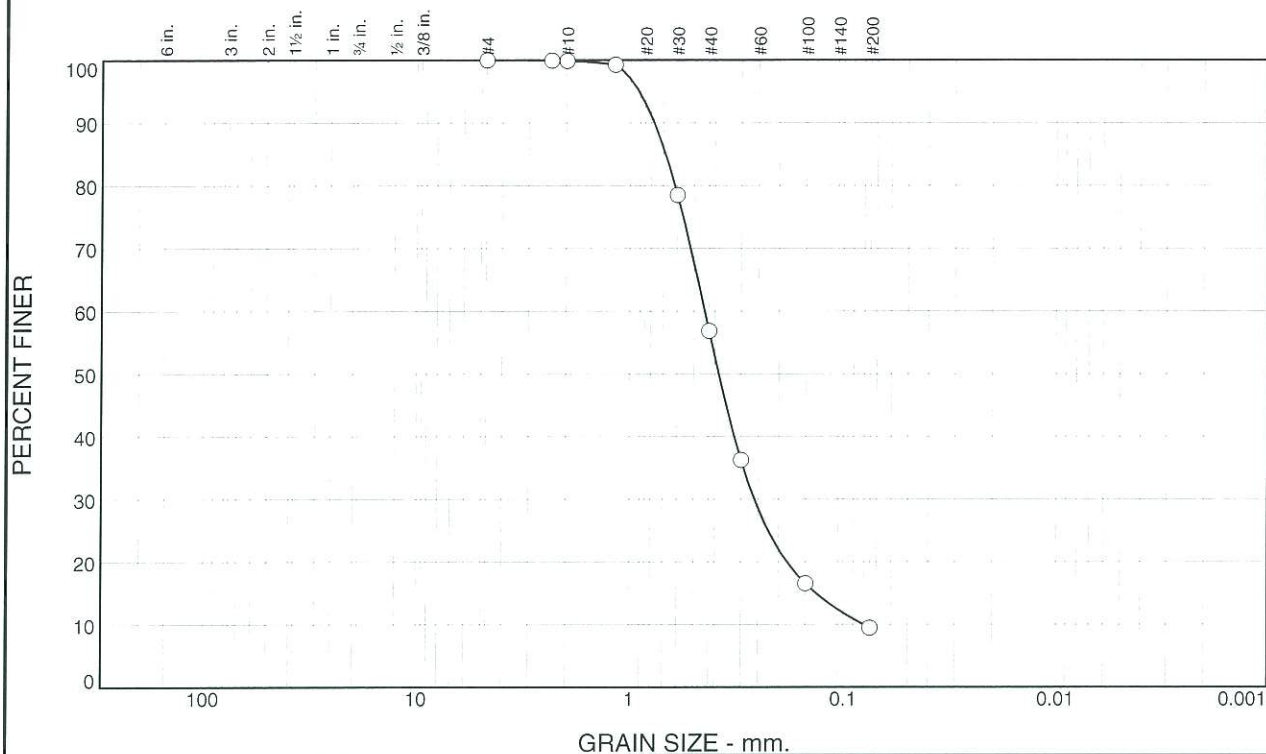
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	43.1	47.3	9.5	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	99.9		
#16	99.3		
#30	78.5		
#40	56.8		
#50	36.3		
#100	16.6		
#200	9.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7746 D_{85}= 0.6840 D_{60}= 0.4459
D_{50}= 0.3821 D_{30}= 0.2597 D_{15}= 0.1333
D_{10}= 0.0798 C_u= 5.59 C_c= 1.90

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R, S10
**Sample Number:** S35703   **Depth:** 45-45.8

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
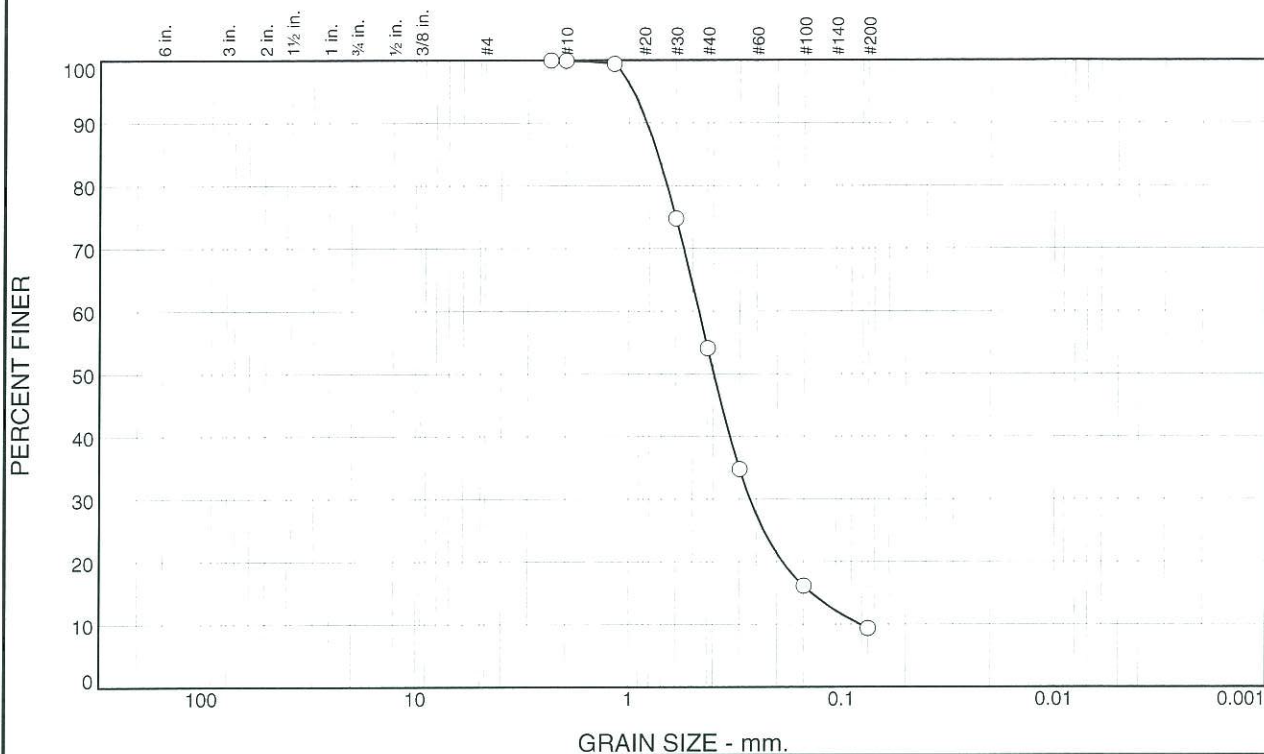
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	45.9	44.7	9.4	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	99.5		
#30	74.8		
#40	54.1		
#50	34.8		
#100	16.2		
#200	9.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.8260 D_{85}= 0.7339 D_{60}= 0.4679
D_{50}= 0.3972 D_{30}= 0.2675 D_{15}= 0.1374
D_{10}= 0.0812 C_u= 5.76 C_c= 1.88

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S17
Sample Number: S35708   Depth: 80-81.2
Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
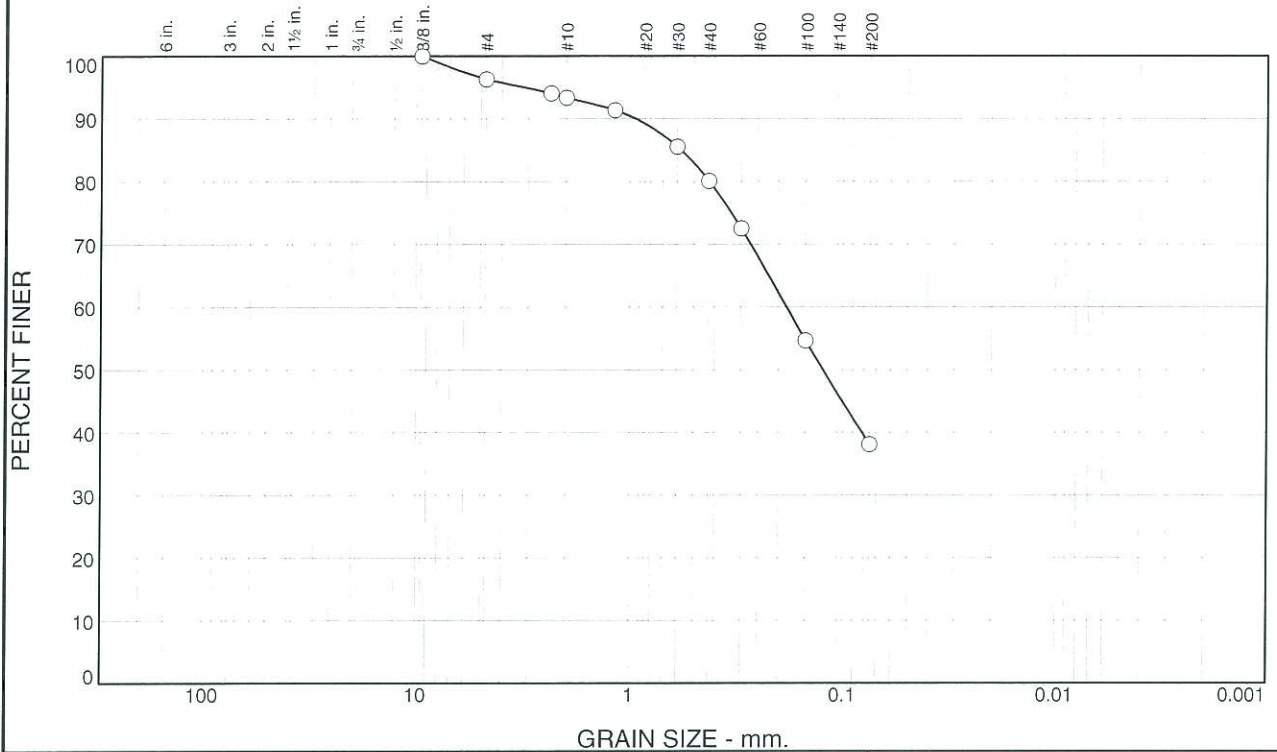
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.7	2.9	13.3	42.0	38.1	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	96.3		
#8	94.1		
#10	93.4		
#16	91.4		
#30	85.5		
#40	80.1		
#50	72.5		
#100	54.7		
#200	38.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.9415 D_{85}= 0.5762 D_{60}= 0.1840
D_{50}= 0.1242 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

friable particles

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R. S23
Sample Number: S35713   Depth: 110-111.2   Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
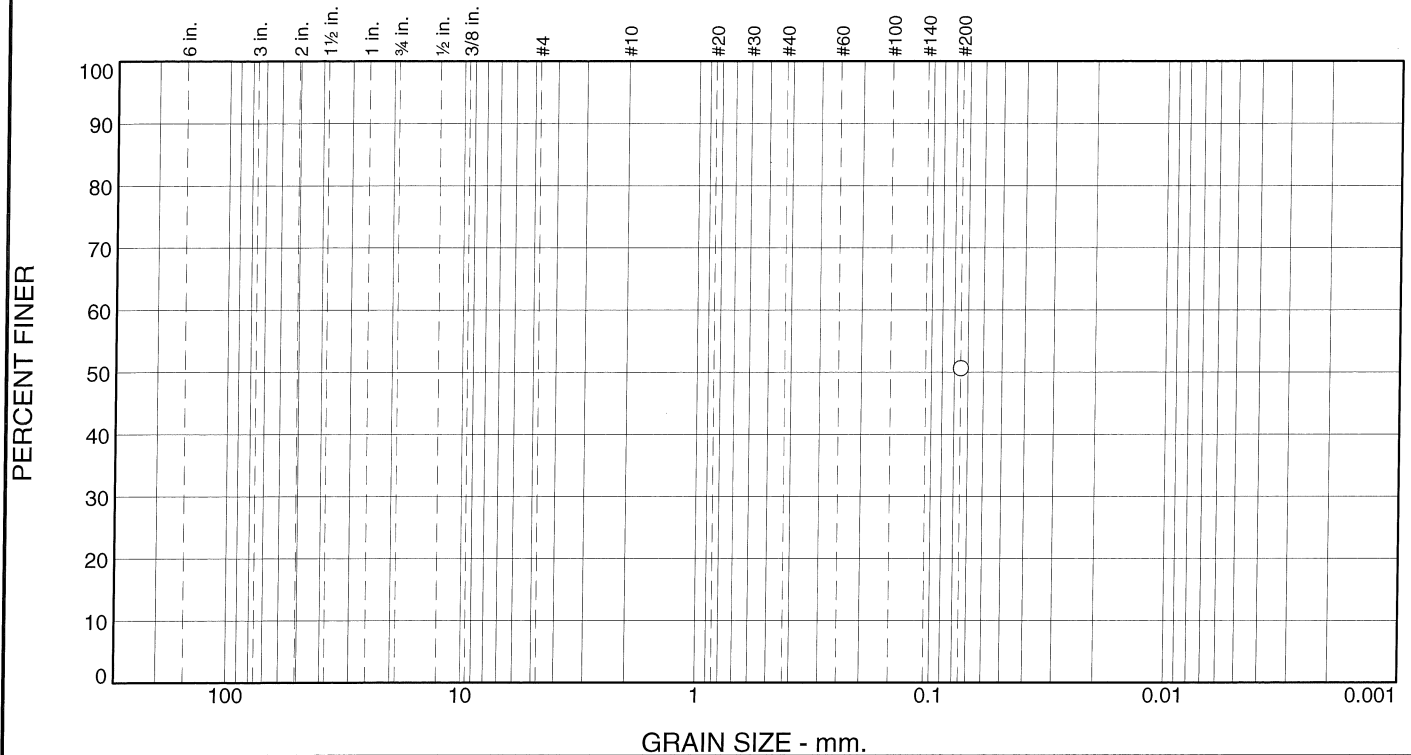
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
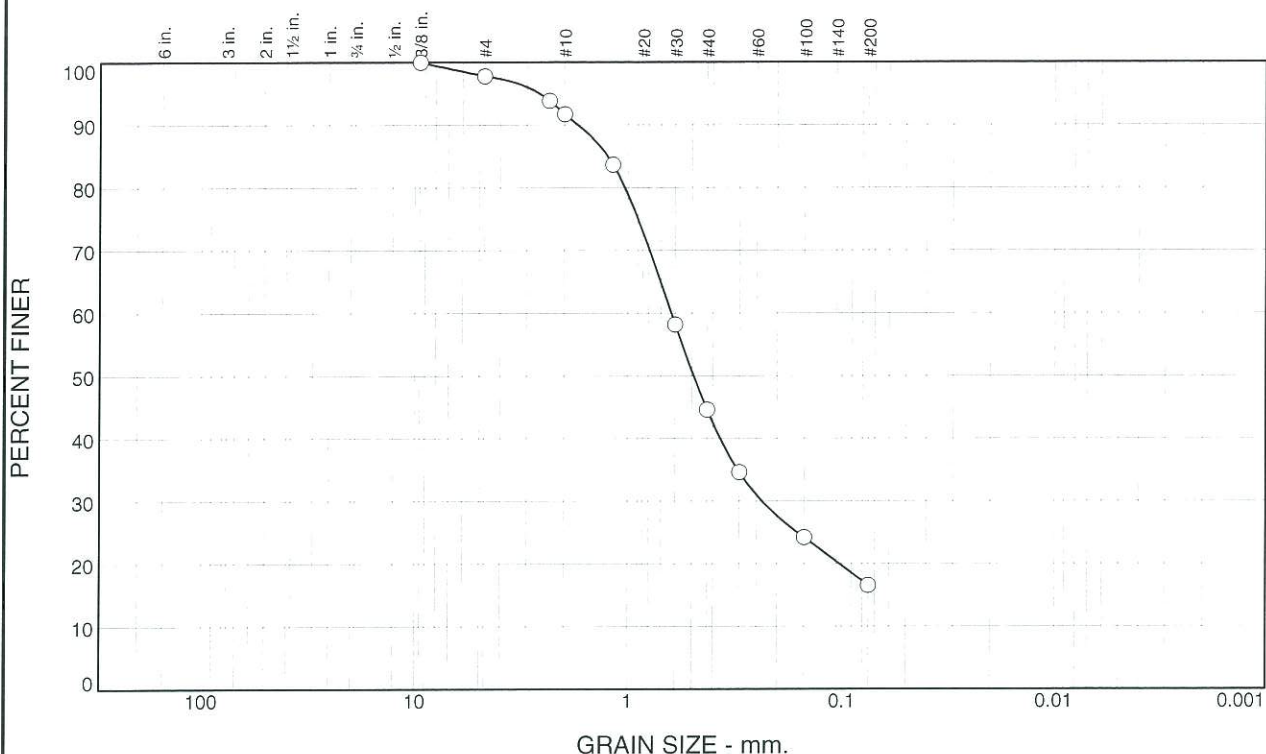
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	6.1	47.1	28.0	16.6	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	97.8		
#8	93.9		
#10	91.7		
#16	83.7		
#30	58.2		
#40	44.6		
#50	34.7		
#100	24.3		
#200	16.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 1.7311 D_{85}= 1.2498 D_{60}= 0.6260
D_{50}= 0.4917 D_{30}= 0.2350 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: pm

Date Sampled:

Location: S0018R, S26
Sample Number: S35715   Depth: 125-125.8

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
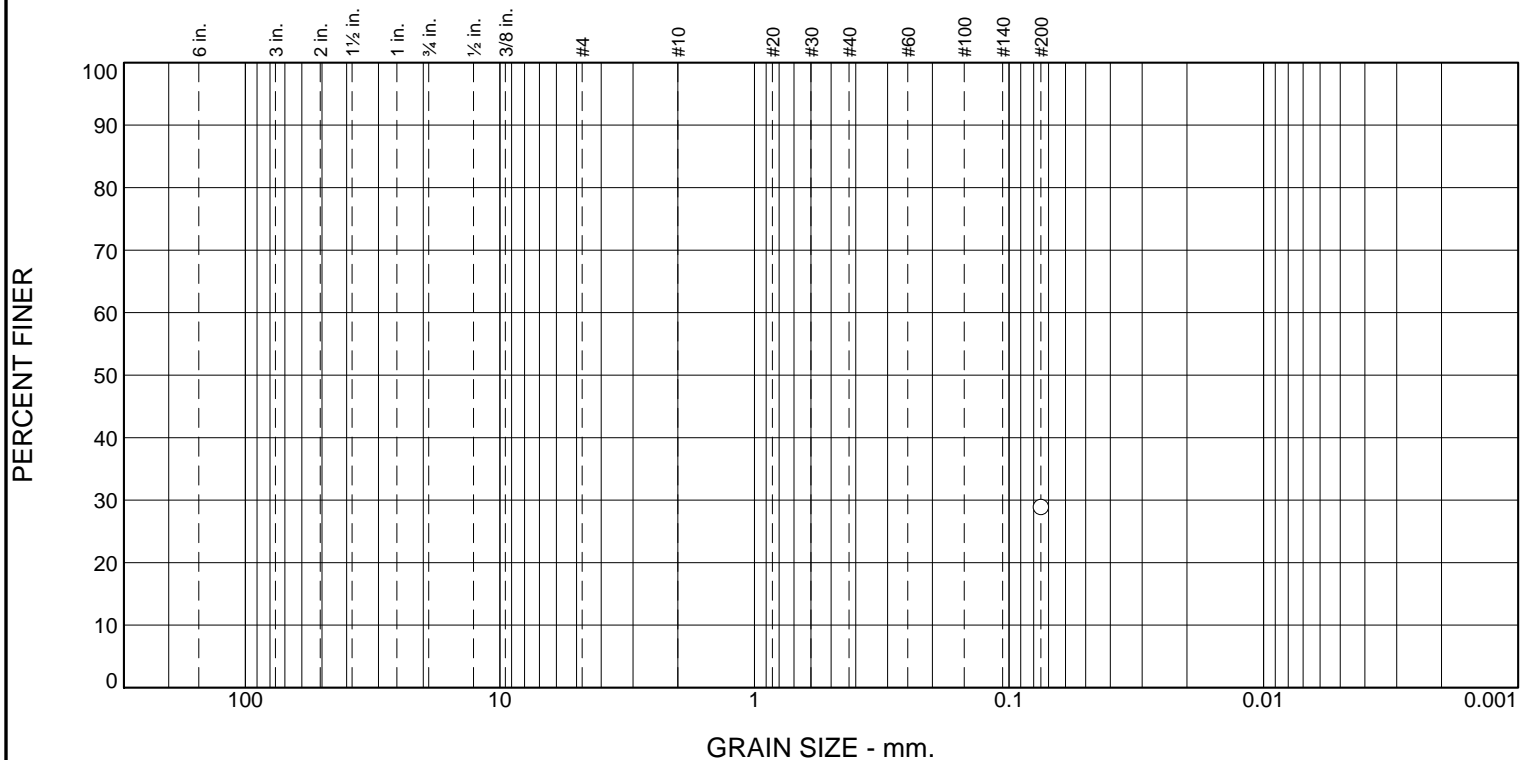Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
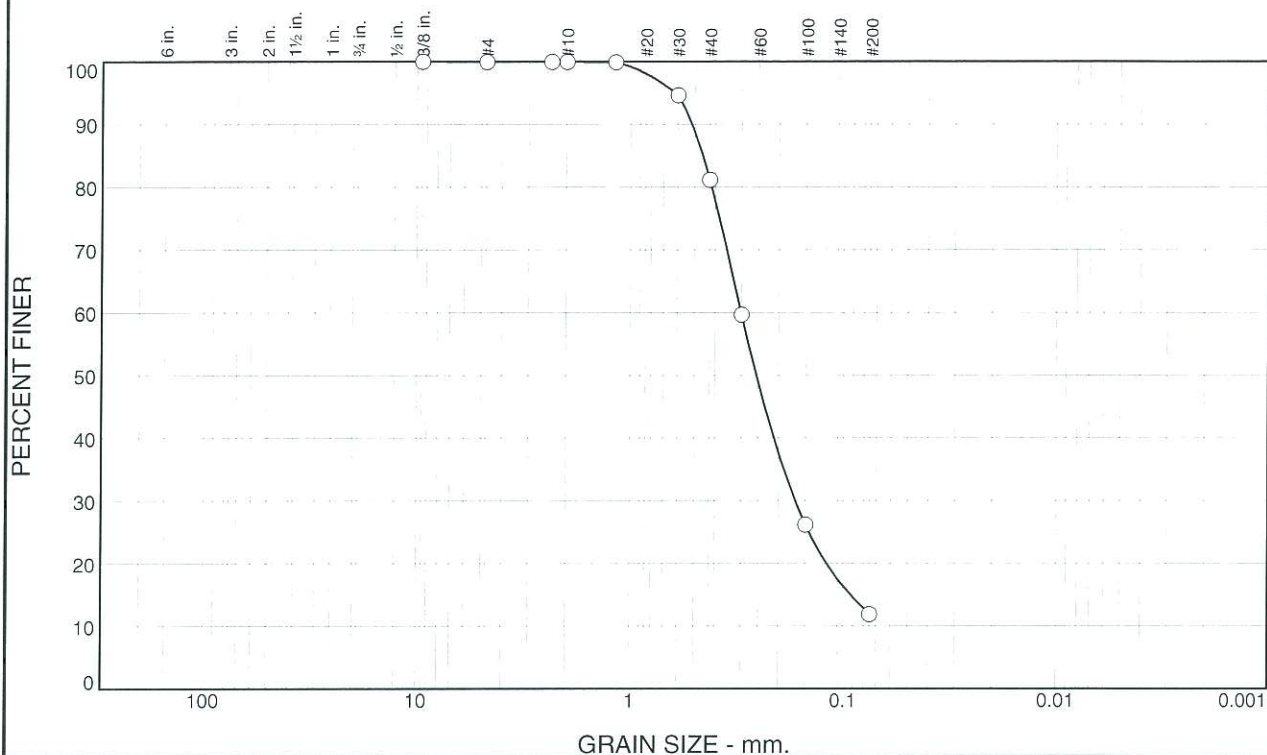
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	18.7	69.3	11.9	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100.0		
#4	99.9		
#8	99.9		
#10	99.9		
#16	99.9		
#30	94.6		
#40	81.2		
#50	59.7		
#100	26.2		
#200	11.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.5168 D_{85}= 0.4586 D_{60}= 0.3015
D_{50}= 0.2550 D_{30}= 0.1671 D_{15}= 0.0918
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0019R. S07
Sample Number: S35722   **Depth:** 12.5-13.8

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.
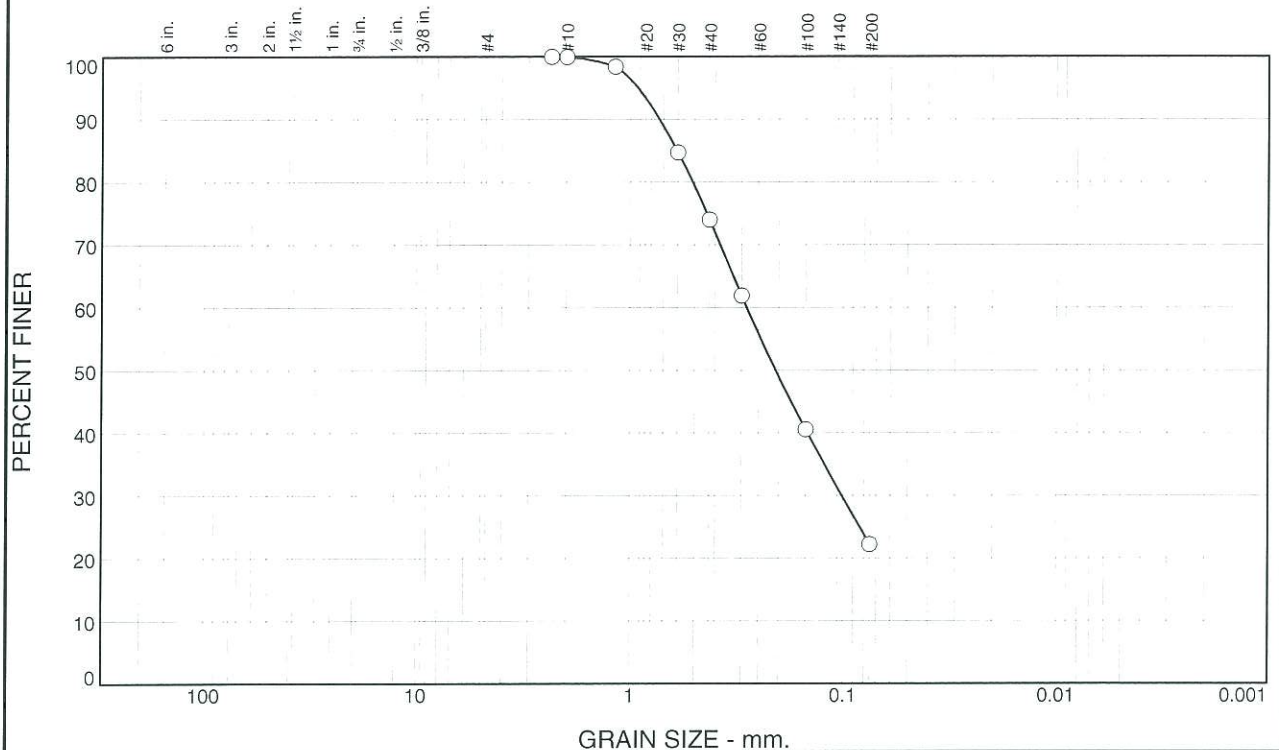
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	25.9	51.7	22.3	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	99.9		
#16	98.4		
#30	84.7		
#40	74.0		
#50	61.9		
#100	40.6		
#200	22.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= 0.7325 D_{85}= 0.6061 D_{60}= 0.2837
D_{50}= 0.2074 D_{30}= 0.1011 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0019R, S09
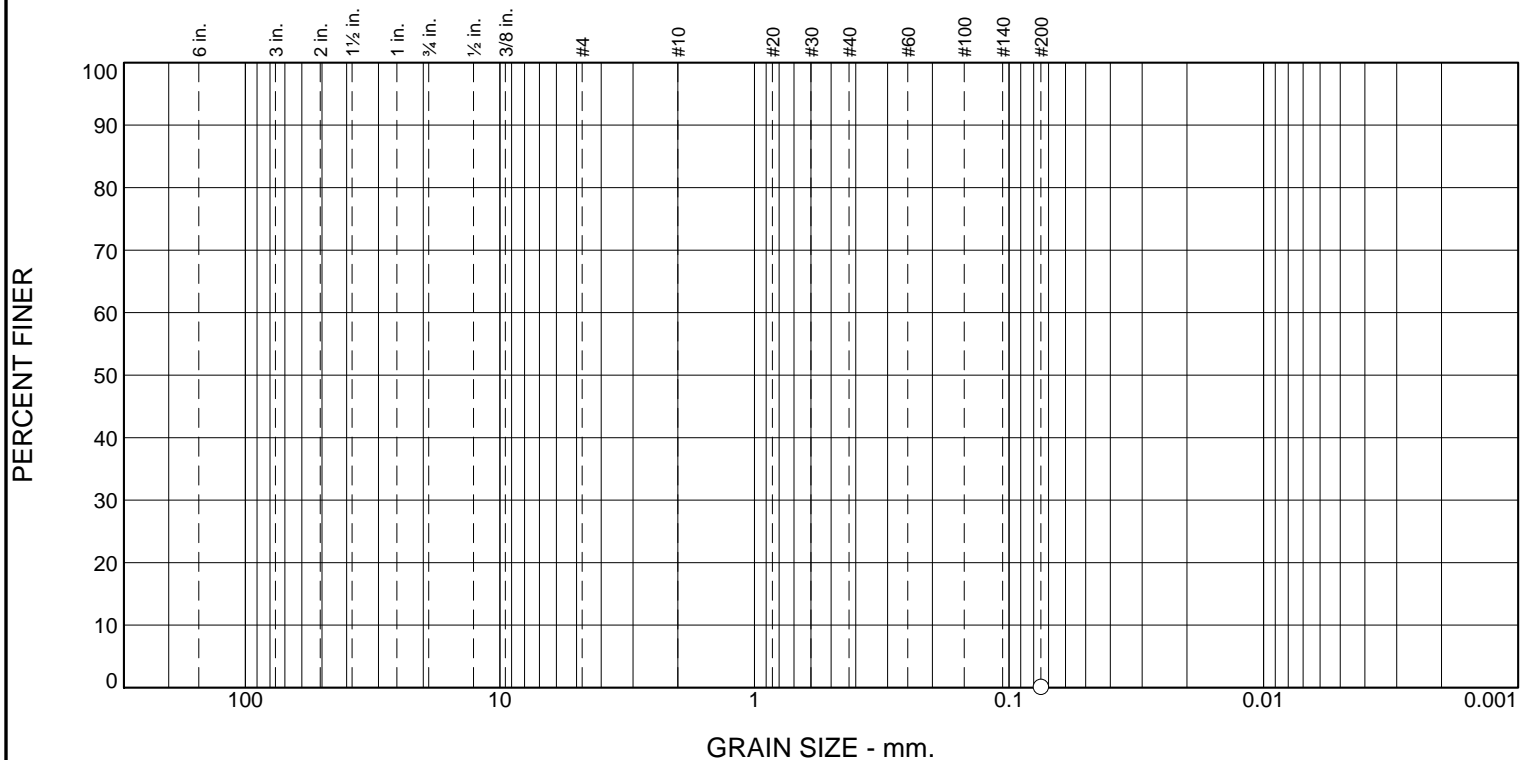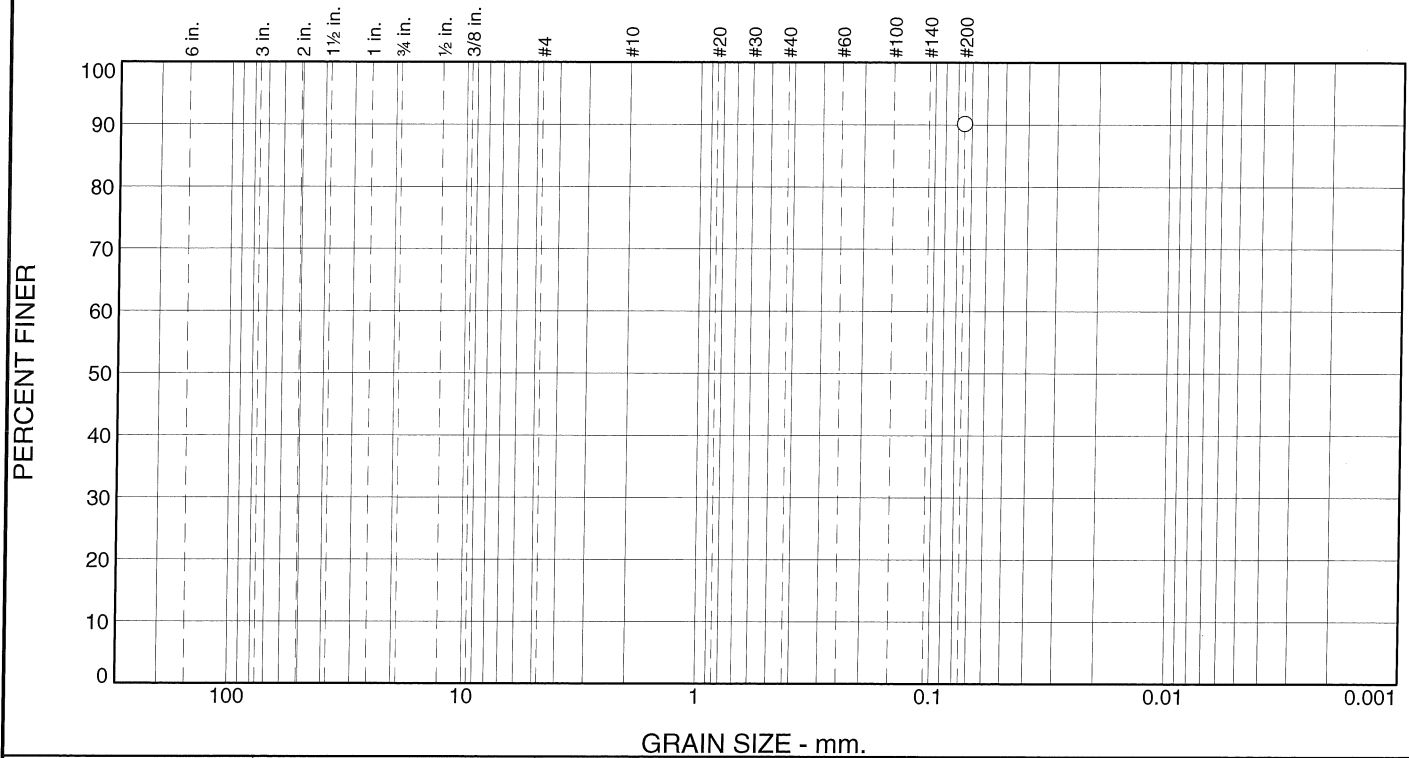Sample Number: S35723   Depth: 20-21.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111

Figure

Particle Size Distribution Report

PERCENT FINER (y-axis, 0 to 100)

GRAIN SIZE - mm. (x-axis, 100 to 0.001)

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						31.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	31.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0001R, S01
Sample Number: S36223   **Depth:** 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
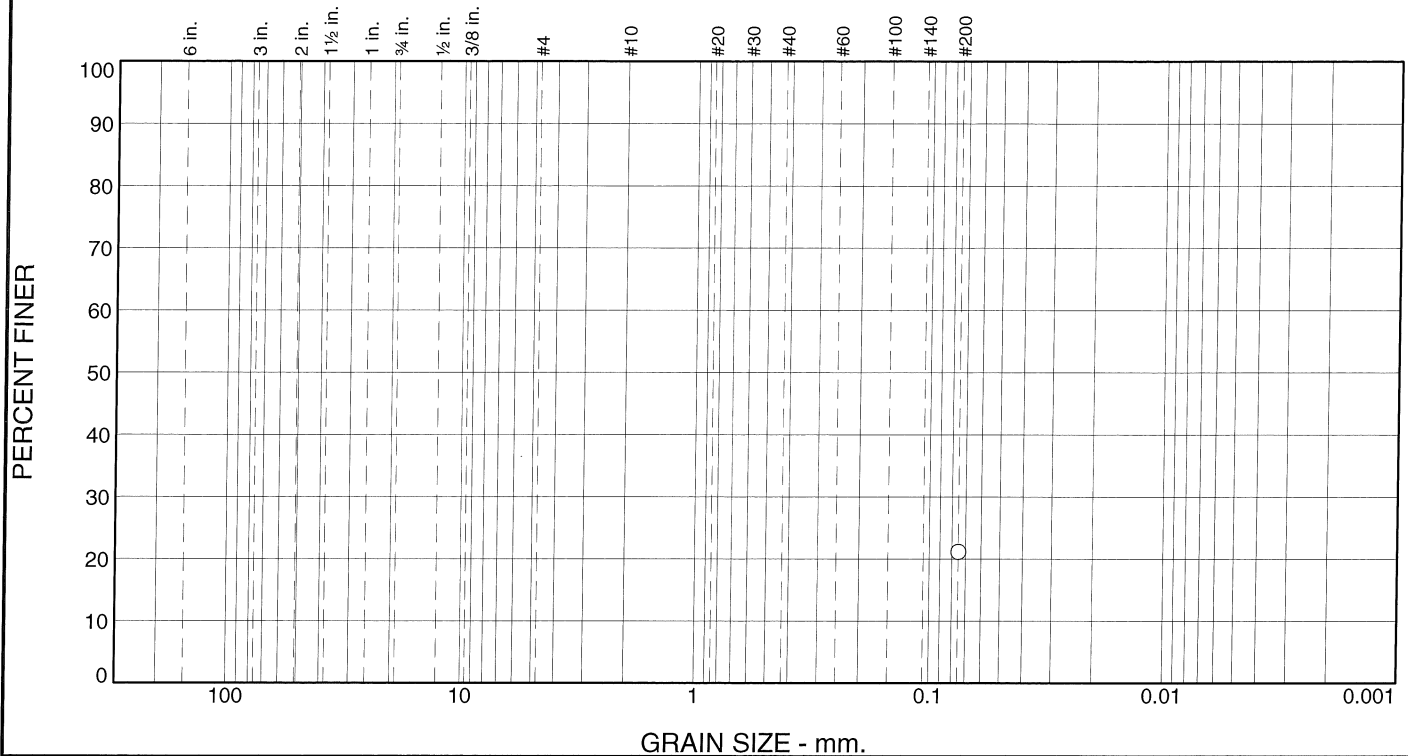
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						21.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	21.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: mw
Checked By: js
Title: PM

Location: S0001R, S03
Sample Number: S35488   Depth: 6.5-8.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
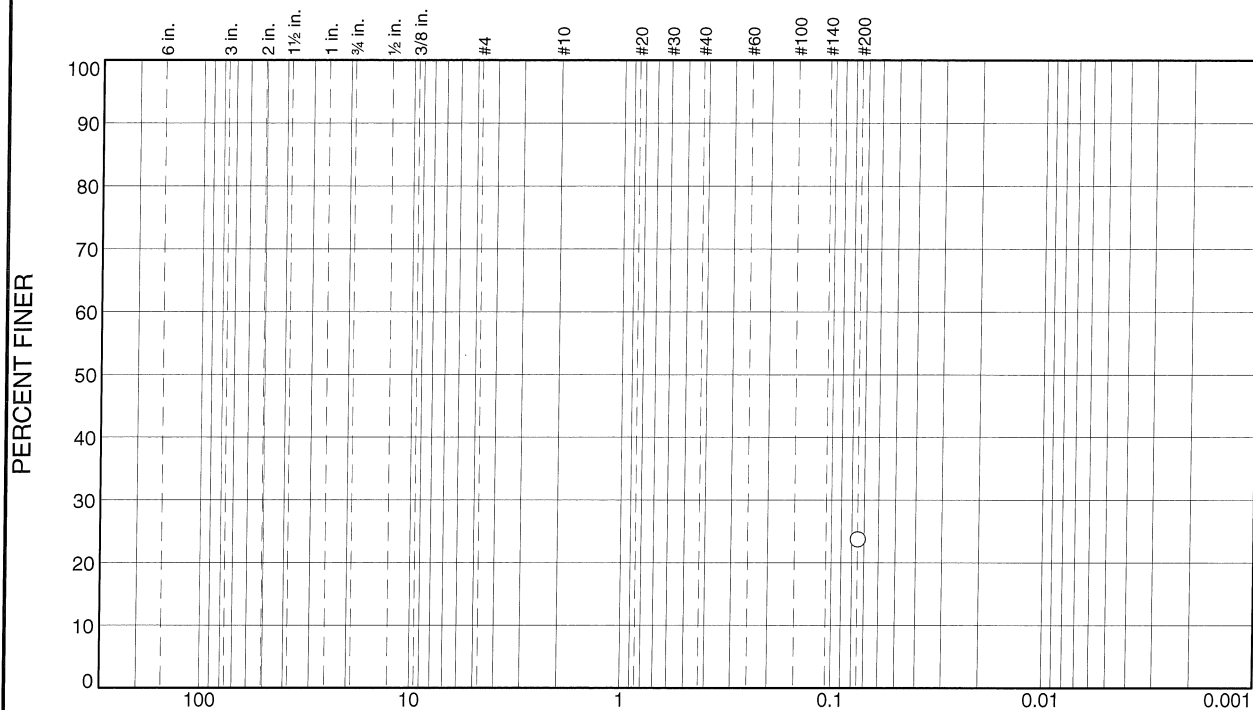
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	8.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0001R, S04
Sample Number: S36224   **Depth:** 8-9.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
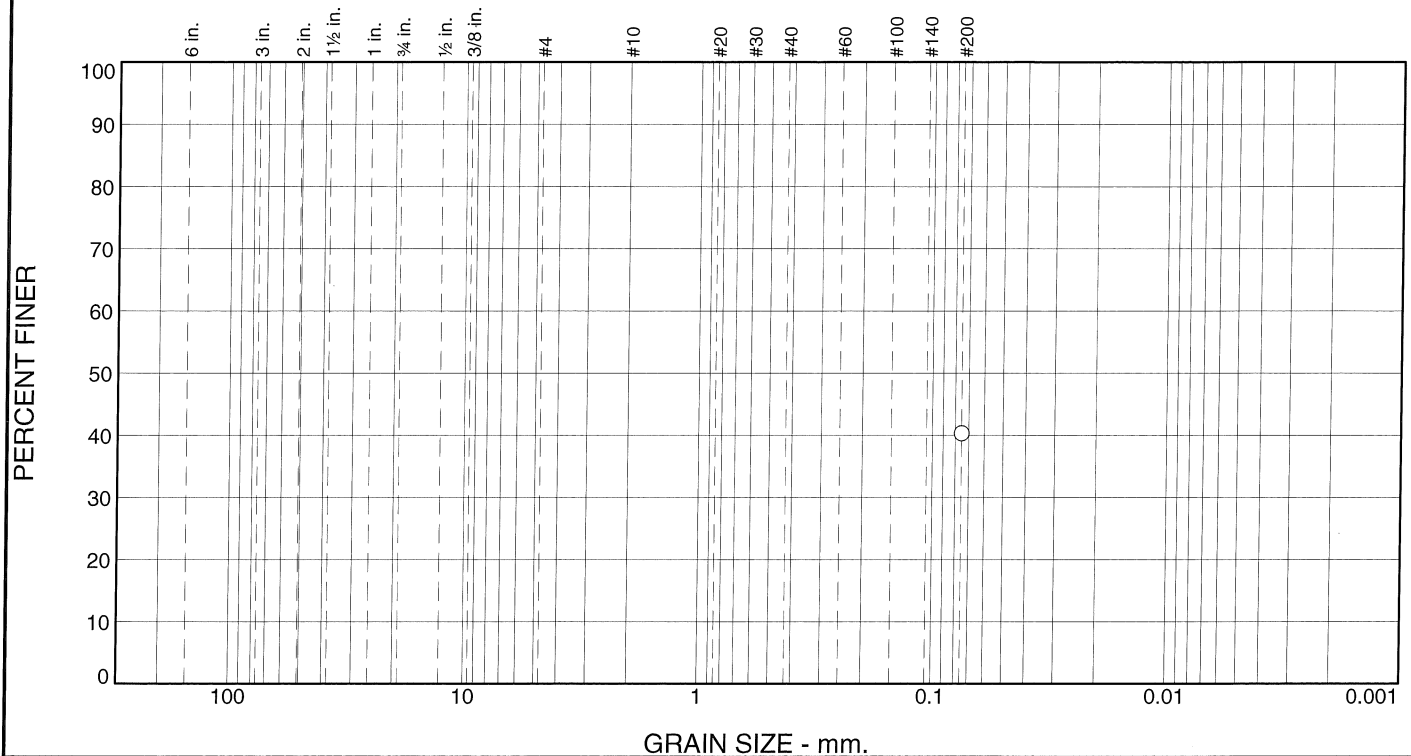
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	40.4		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

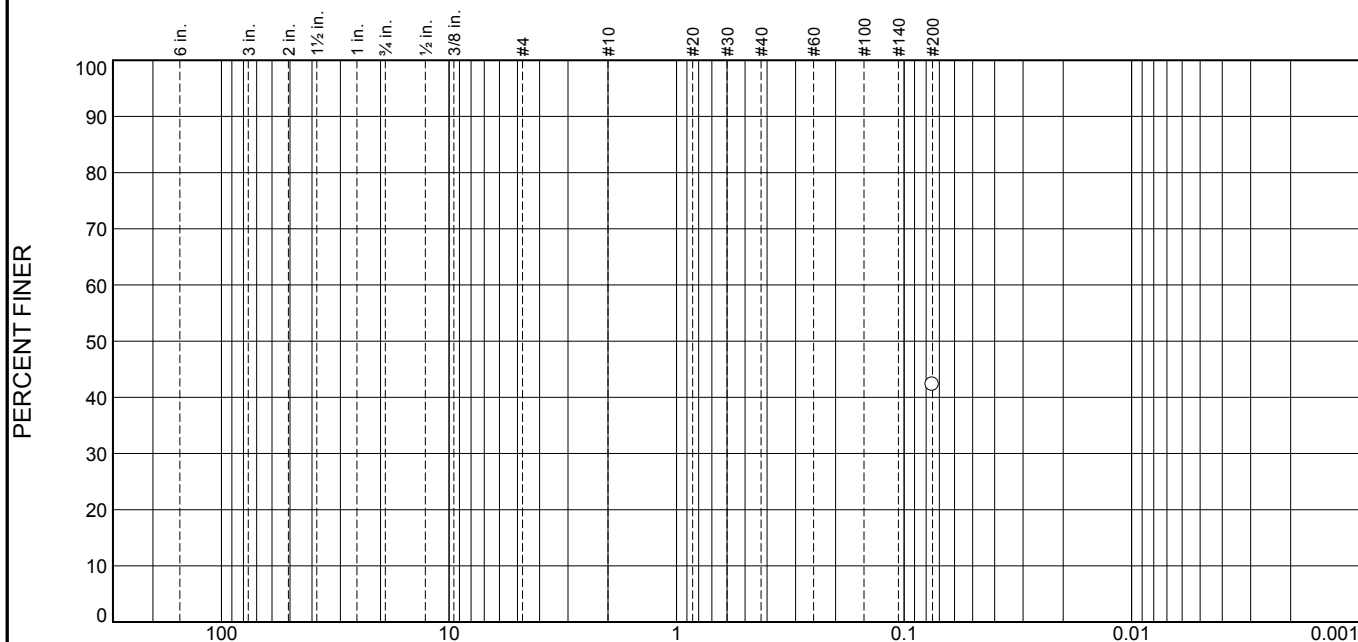* (no specification provided)

Location: S0001R, S07
Sample Number: S35489   Depth: 12.5-14.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
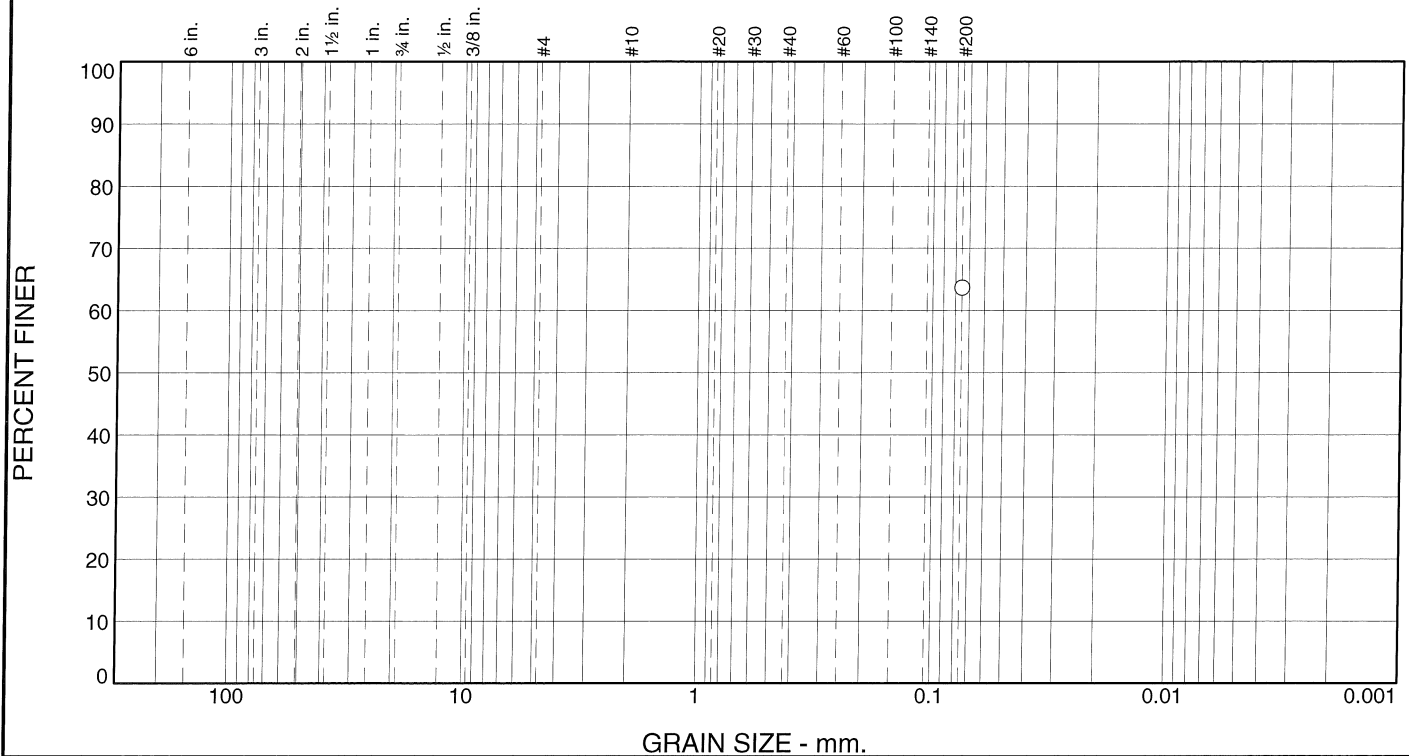
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	63.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 18   LL= 21   PI= 3

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: mw

Checked By: js

Title: PM

* (no specification provided)

Location: S0001R, S09
Sample Number: S35500   Depth: 20-21.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

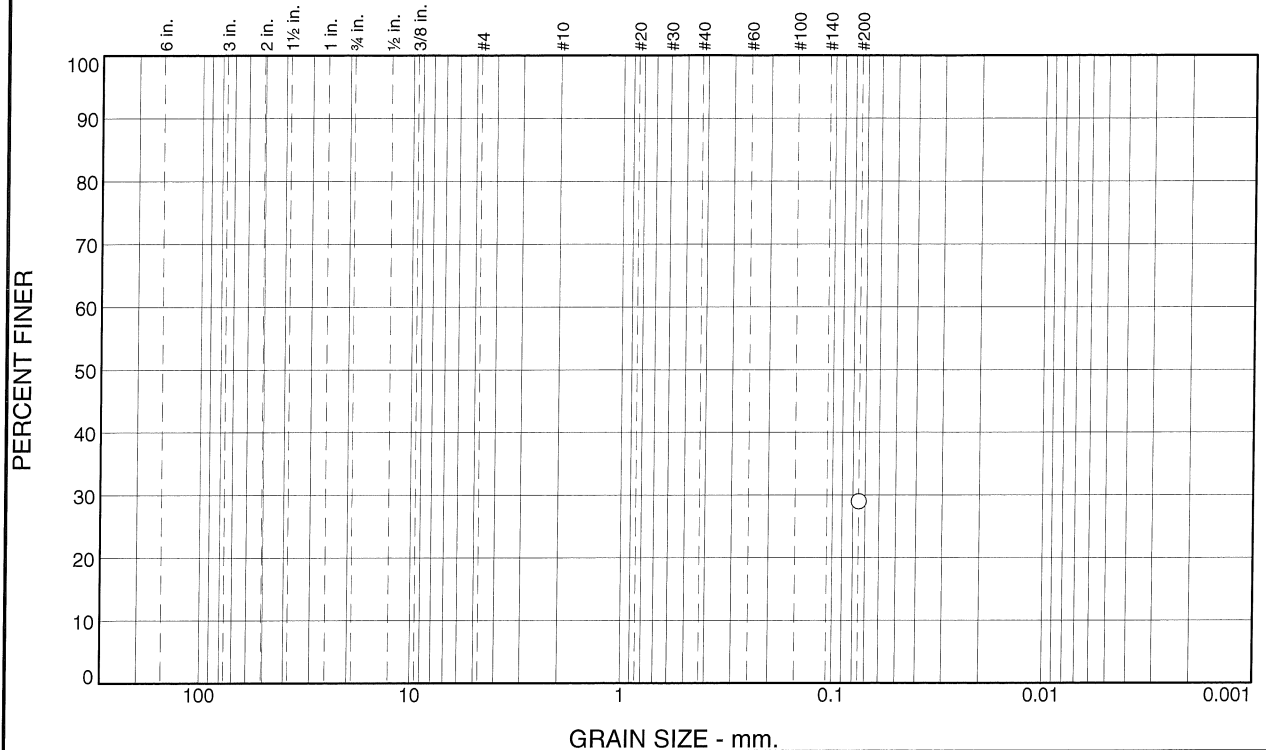Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	50.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 14   LL= 18   PI= 4

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: Date Tested: 11/1/11

Tested By: mw

Checked By: js

Title: PM

Location: S0001R, S10

Sample Number: S35501   Depth: 25-26.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
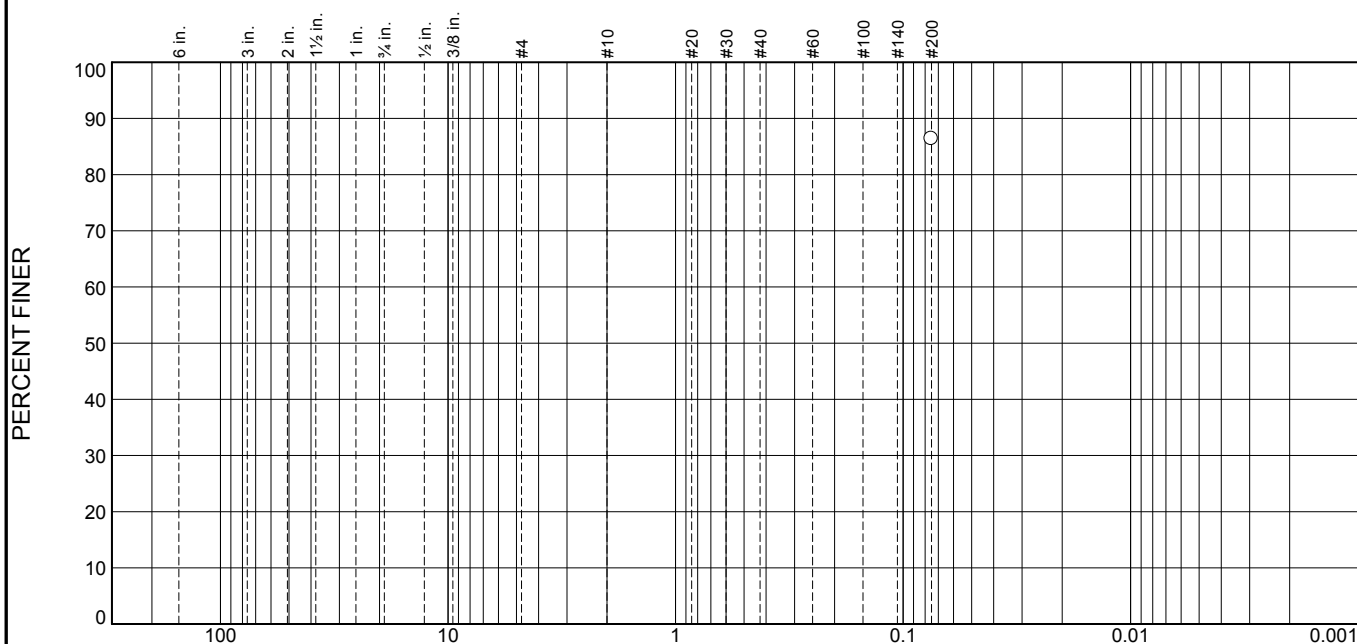
Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

| Sieve markers | 6 in. | 3 in. | 2 in. | 1½ in. | 1 in. | ¾ in. | ½ in. | 3/8 in. | #4 | #10 | #20 | #30 | #40 | #60 | #100 | #140 | #200 |

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						28.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	28.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac

Checked By: cw

Title: PM

Location: S0001R, S11A
Sample Number: S36226   **Depth:** 30-30.8

Date Sampled:

SIERRA TESTING LABS, INC.
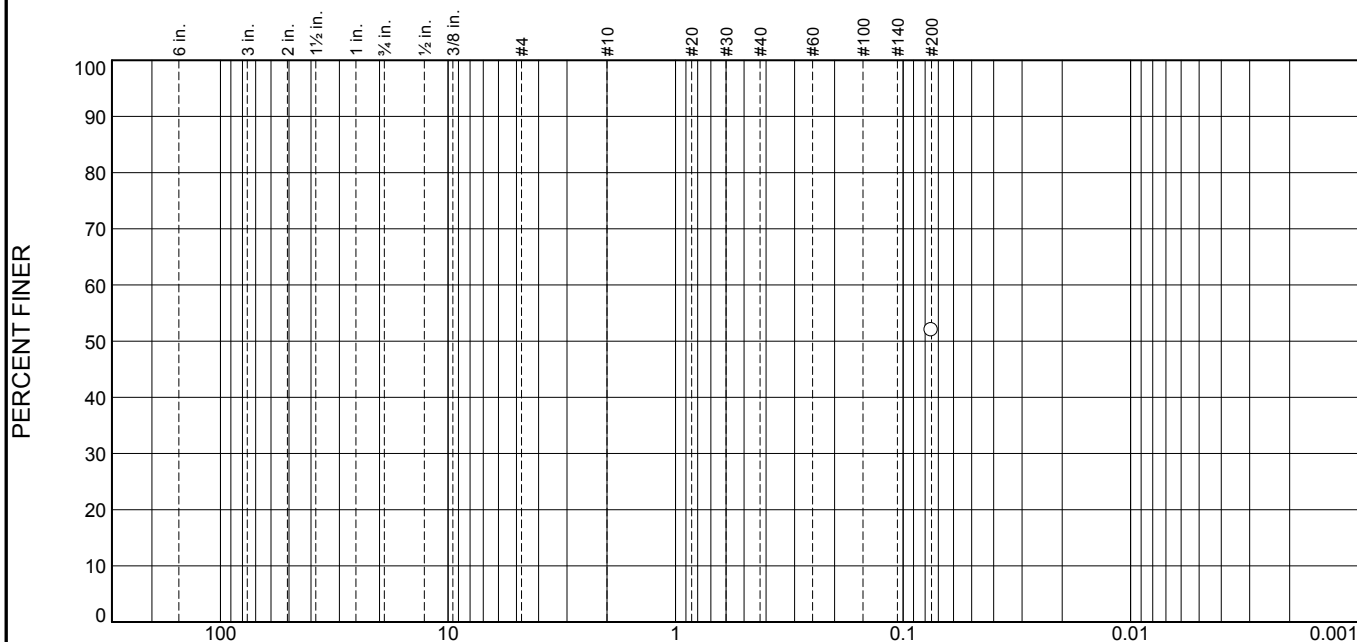## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						0.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	0.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0001R, S13
Sample Number: S36227   **Depth:** 40-41.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						90.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	90.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 21   LL= 26   PI= 5

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: mw

Checked By: js

Title: PM

Location: S0001R, S15
Sample Number: S35503   Depth: 50-51.5

Date Sampled:

SIERRA TESTING LABS, INC.
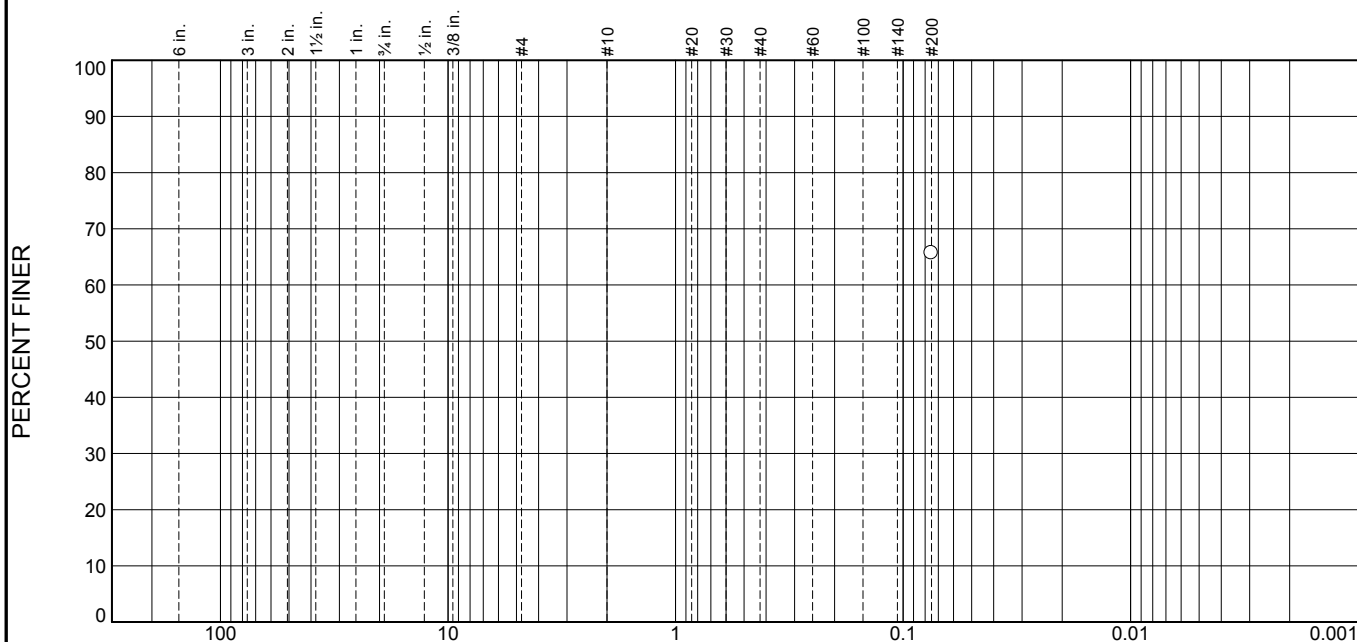## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						23.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	23.8		

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: ky

Title: cw

* (no specification provided)

Location: S0002R, S01
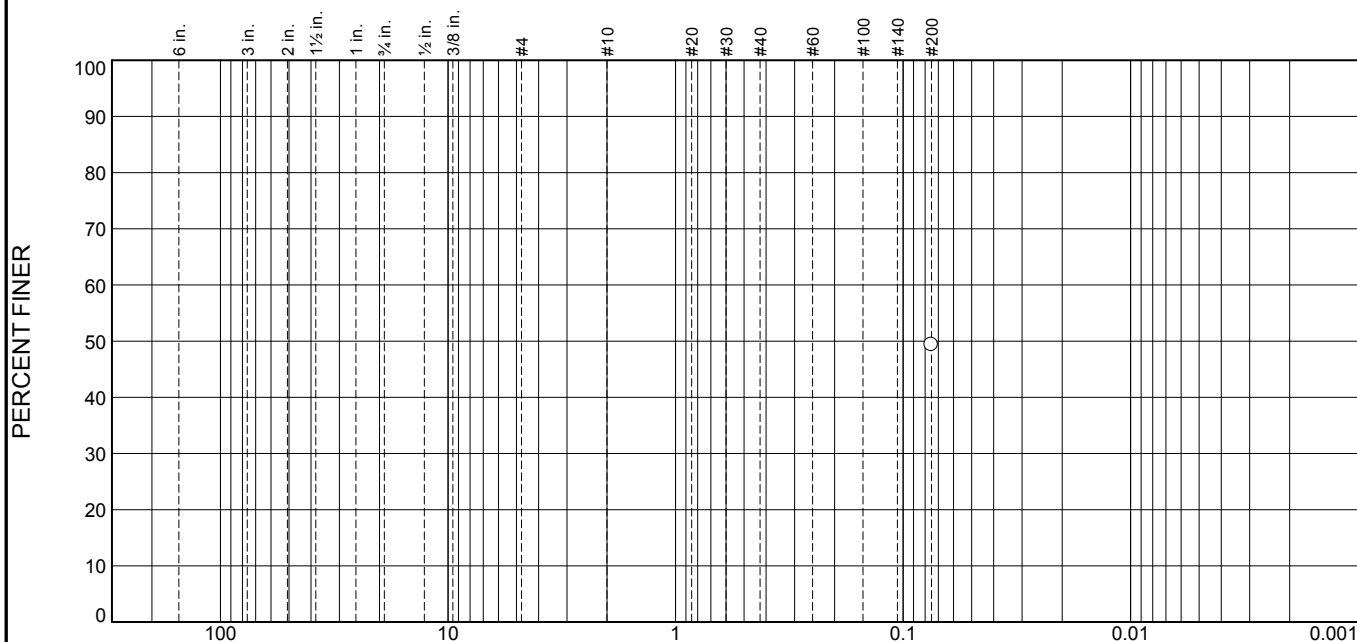Sample Number: S36228   Depth: 0-5.0   Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
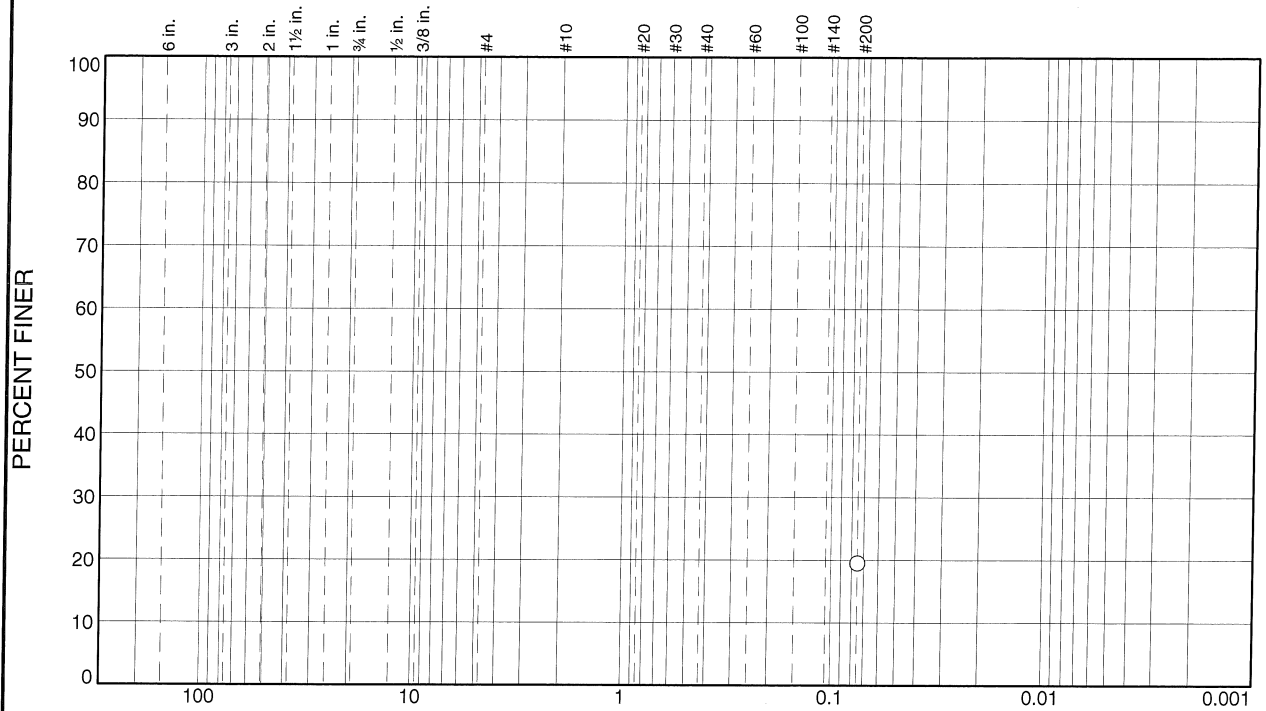
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						19.5	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	19.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ky

Checked By: cw

Title: PM

Location: S0002R, S02
Sample Number: S36229   **Depth:** 5-6.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes marked: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						42.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	42.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0002R, S04
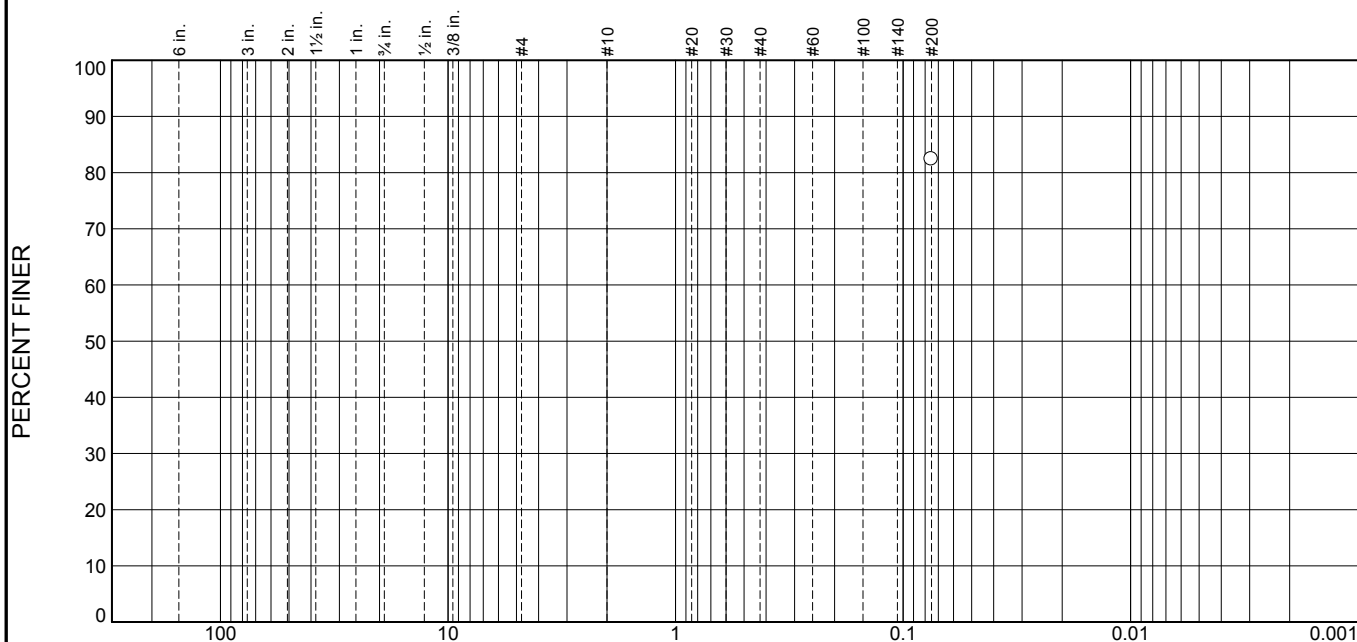**Sample Number:** S35504   **Depth:** 8-9.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						29.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	29.0		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0002R, S05A
Sample Number: S36230   **Depth:** 9.5-10.3

Date Sampled:

SIERRA TESTING LABS, INC.
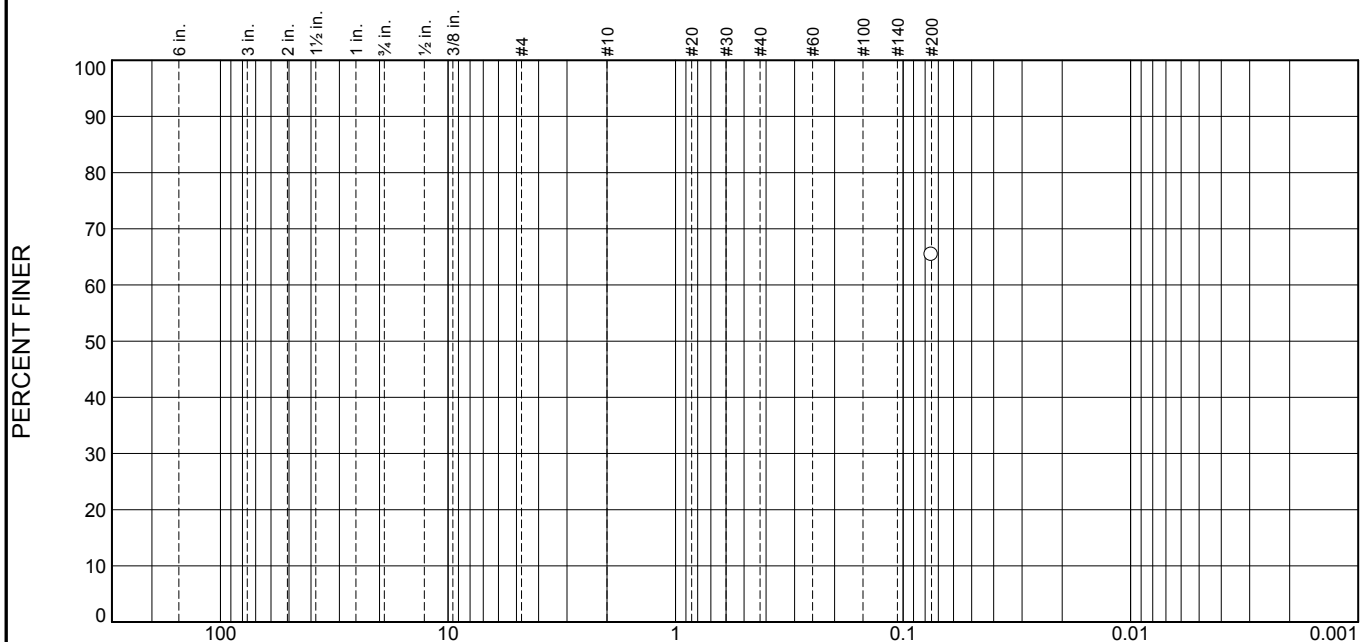## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						86.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	86.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 29   LL= 32   PI= 3

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: mw
Checked By: js
Title: PM

Location: S0002R, S12
**Sample Number:** S35508   **Depth:** 35-36.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

| | | 6 in. | 3 in. | 2 in. | 1½ in. | 1 in. | ¾ in. | ½ in. | 3/8 in. | #4 | #10 | #20 | #30 | #40 | #60 | #100 | #140 | #200 | | | |

PERCENT FINER

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	52.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 15   LL= 22   PI= 7

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D$_{90}$=   D$_{85}$=   D$_{60}$=
D$_{50}$=   D$_{30}$=   D$_{15}$=
D$_{10}$=   C$_u$=   C$_c$=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: mw
Checked By: js
Title: PM

Location: S0002R, S13
Sample Number: S35509   **Depth:** 40-41.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
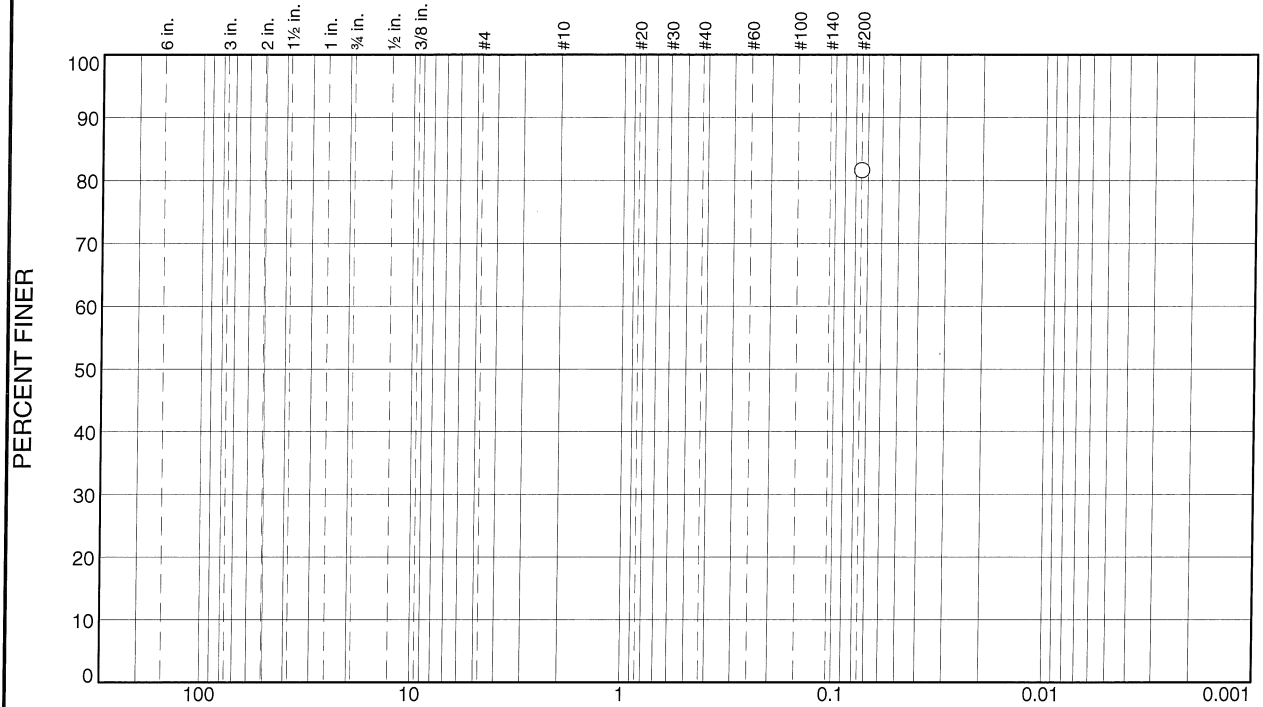
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.7	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	81.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 24   LL= 24   PI= NP

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: mw

Checked By: js

Title: PM

Location: S0002R, S14
Sample Number: S35510   Depth: 45-46.4

Date Sampled:

SIERRA TESTING LABS, INC.
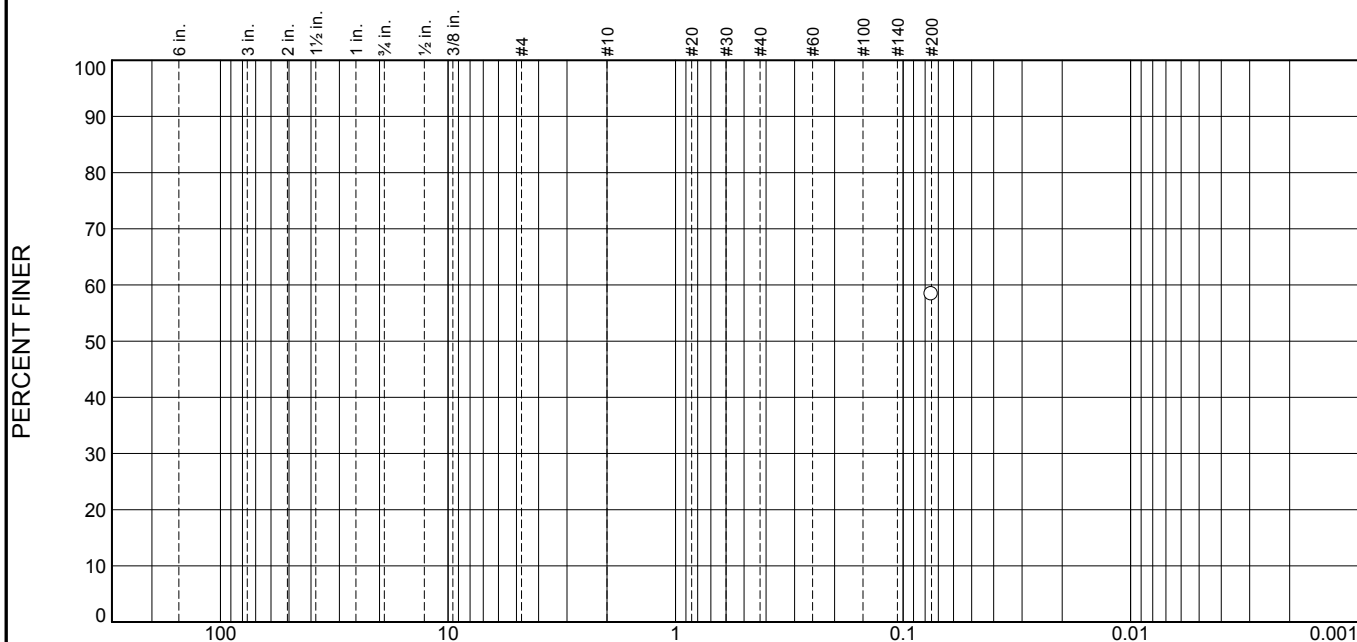## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: mw
Checked By: js
Title: PM

Location: S0002R, S15B
Sample Number: S35511   **Depth:** 50.8-51.3
Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
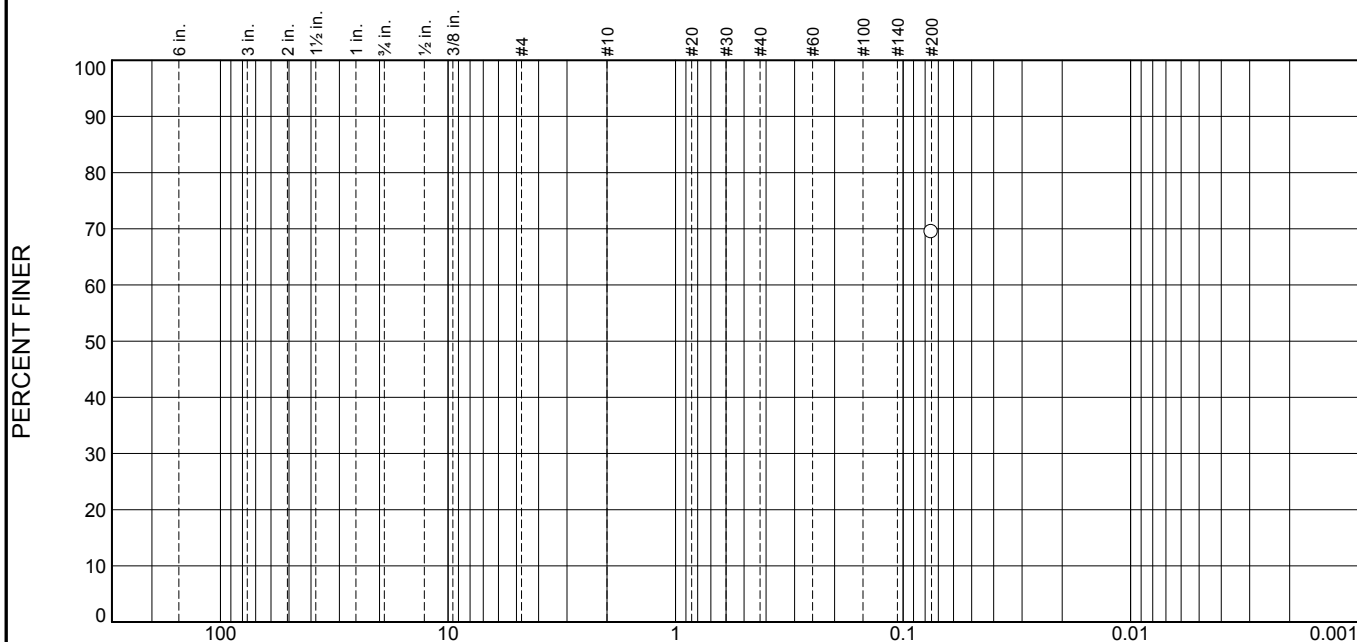
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						49.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	49.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/1/11　　**Date Tested:** 11/1/11
Tested By: mw
Checked By: js
Title: PM

Location: S0002R, S17B
Sample Number: S35512　　**Depth:** 60.6-60.9

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　**Figure**

Particle Size Distribution Report

	100	90	80	70	60	50	40	30	20	10	0

PERCENT FINER

Sieve labels (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	82.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 24   LL= 31   PI= 7

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0002R, S19
Sample Number: S35514   **Depth:** 70-71.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA
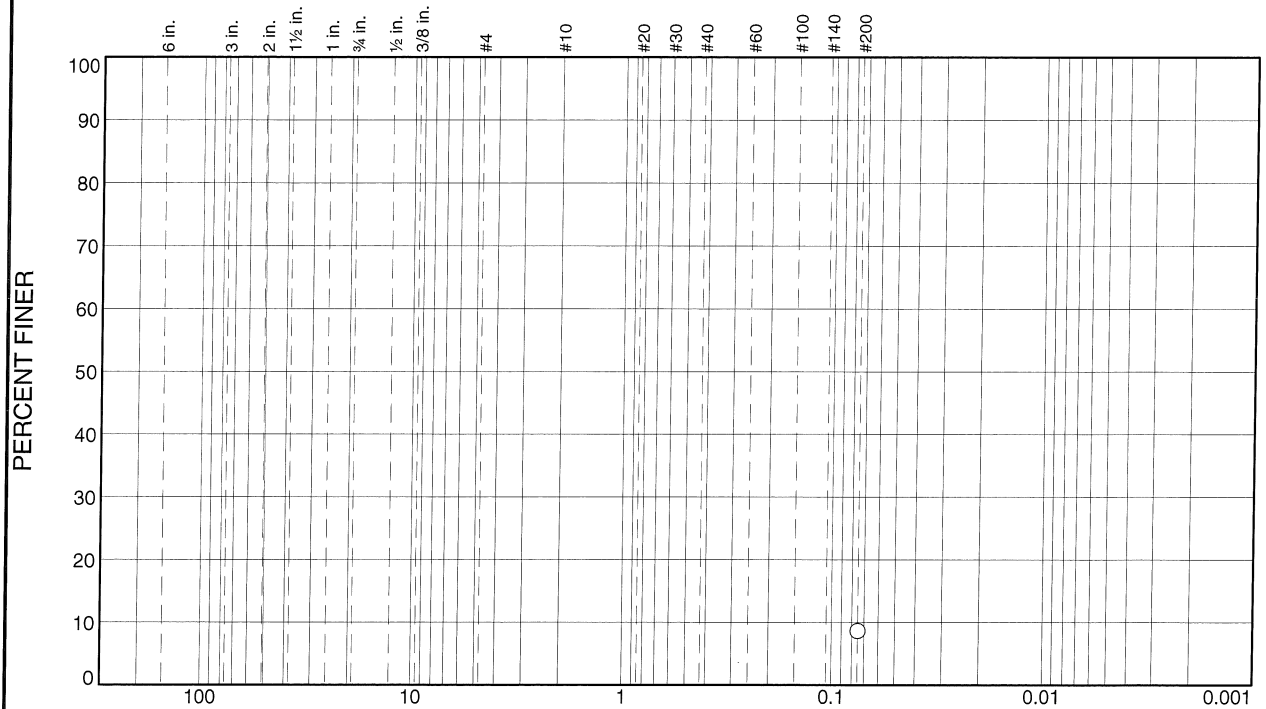
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D$_{90}$=   D$_{85}$=   D$_{60}$=
D$_{50}$=   D$_{30}$=   D$_{15}$=
D$_{10}$=   C$_u$=   C$_c$=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: mw

Checked By: js

Title: PM

Location: S0002R, S21A

Sample Number: S35515   **Depth:** 80-80.7

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
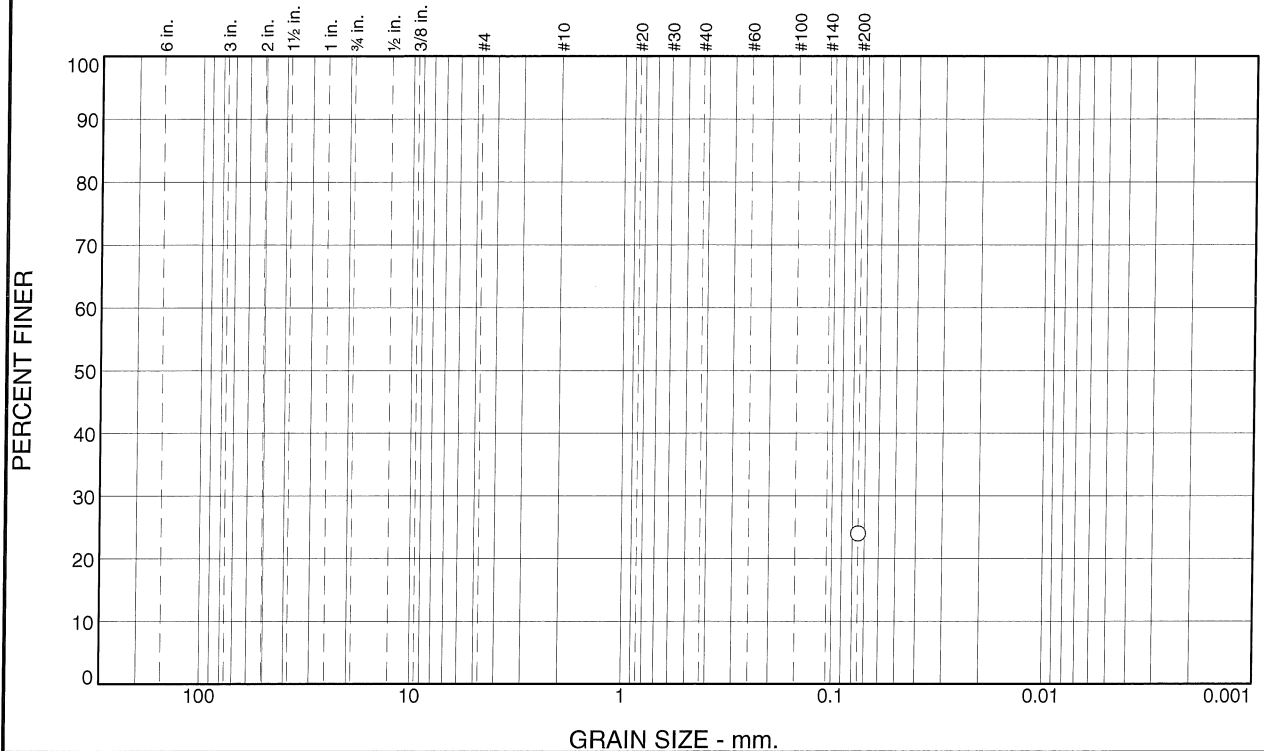
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						24.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	24.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0003R, S01
Sample Number: S36232   Depth: 0-5.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
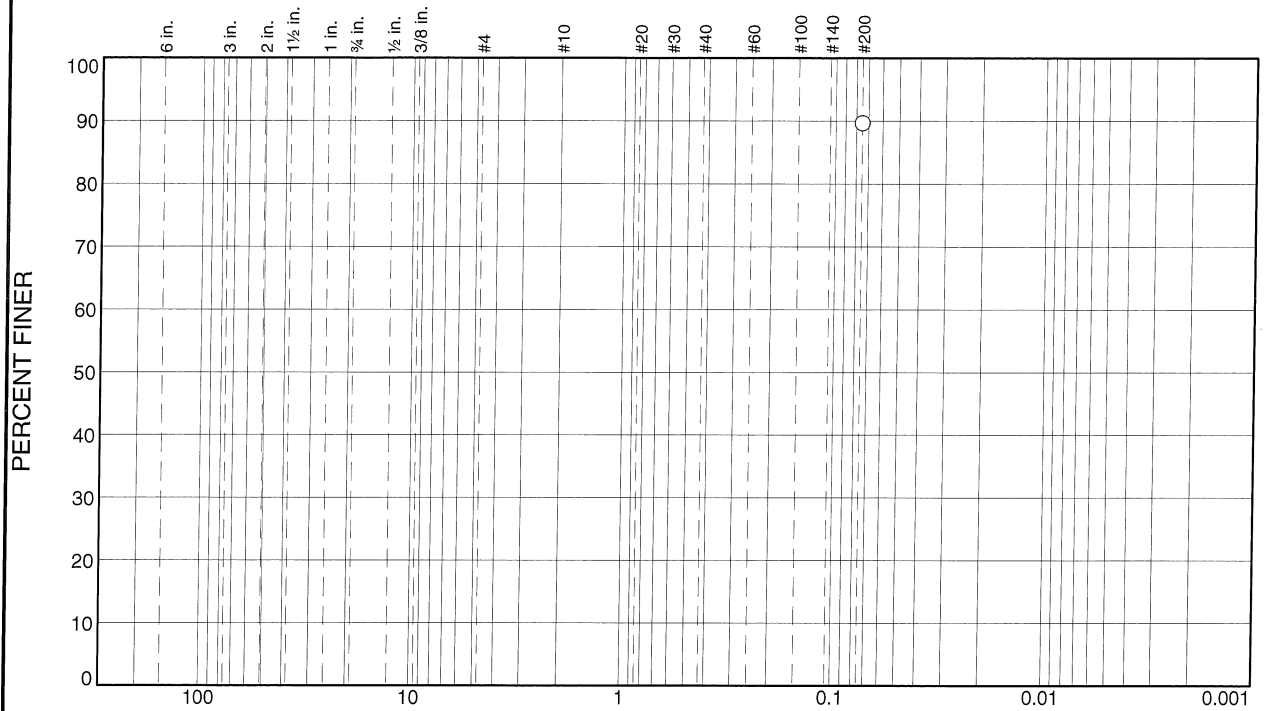
GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						89.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	89.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0003R, S04

Sample Number: S36233   Depth: 8-9.0

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER — vertical axis (100 to 0)

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

GRAIN SIZE - mm. (100, 10, 1, 0.1, 0.01, 0.001)

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 16   LL= 28   PI= 12

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S05
Sample Number: S35518   Depth: 9.5-11.0

Date Sampled:

SIERRA TESTING LABS, INC.
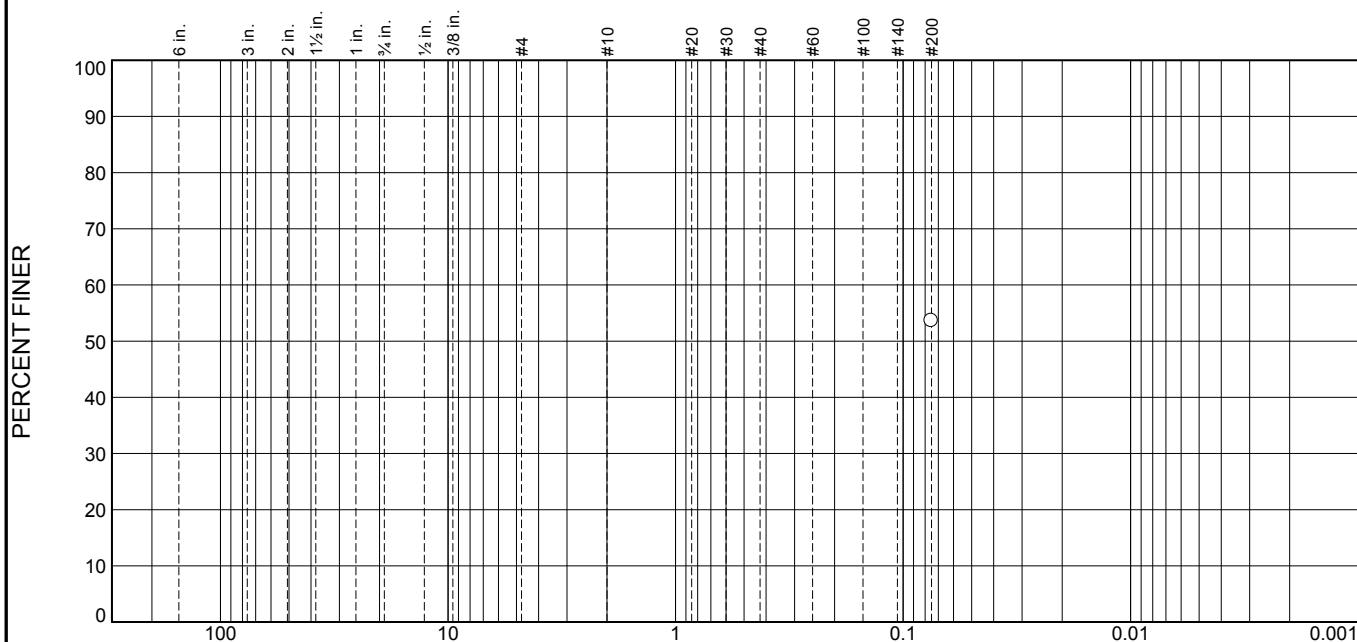**El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve markers (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						69.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	69.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 26   LL= 32   PI= 6

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S06
Sample Number: S35519   **Depth:** 11-12.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
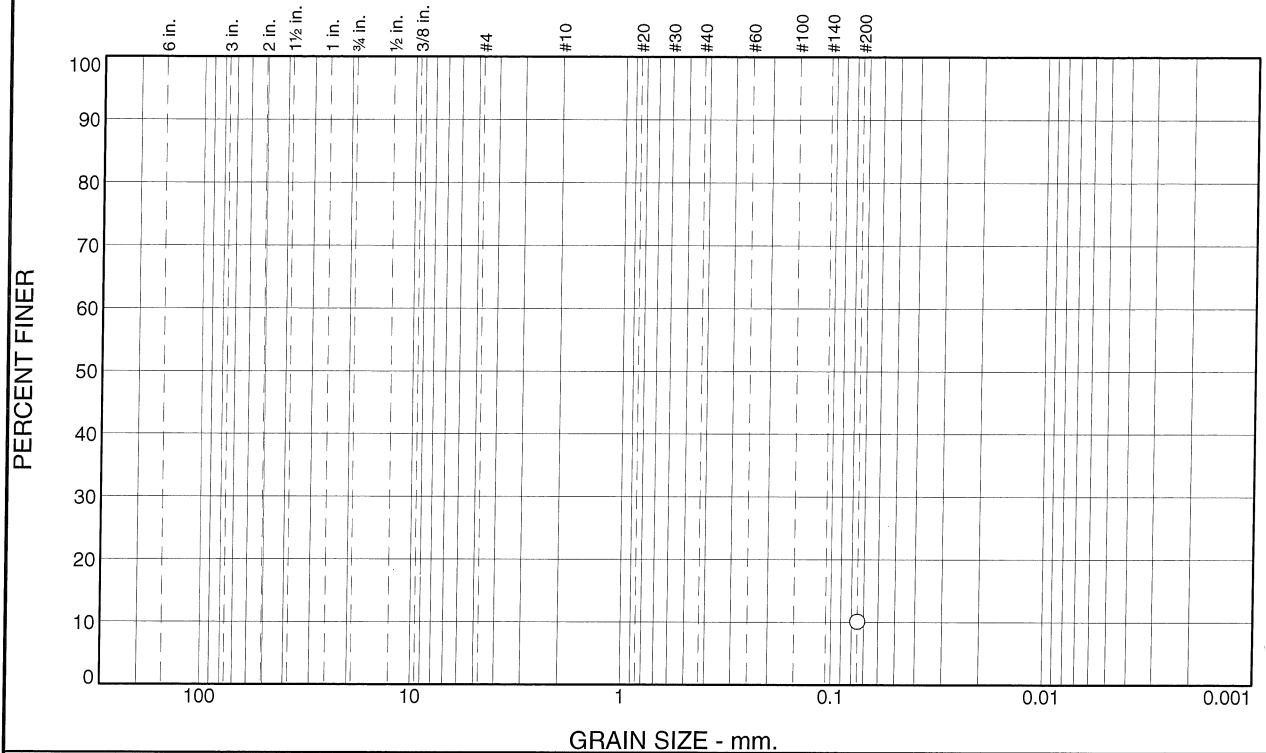
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						10.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	10.2		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0003R, S08
Sample Number: S36234   Depth: 14-15.2

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

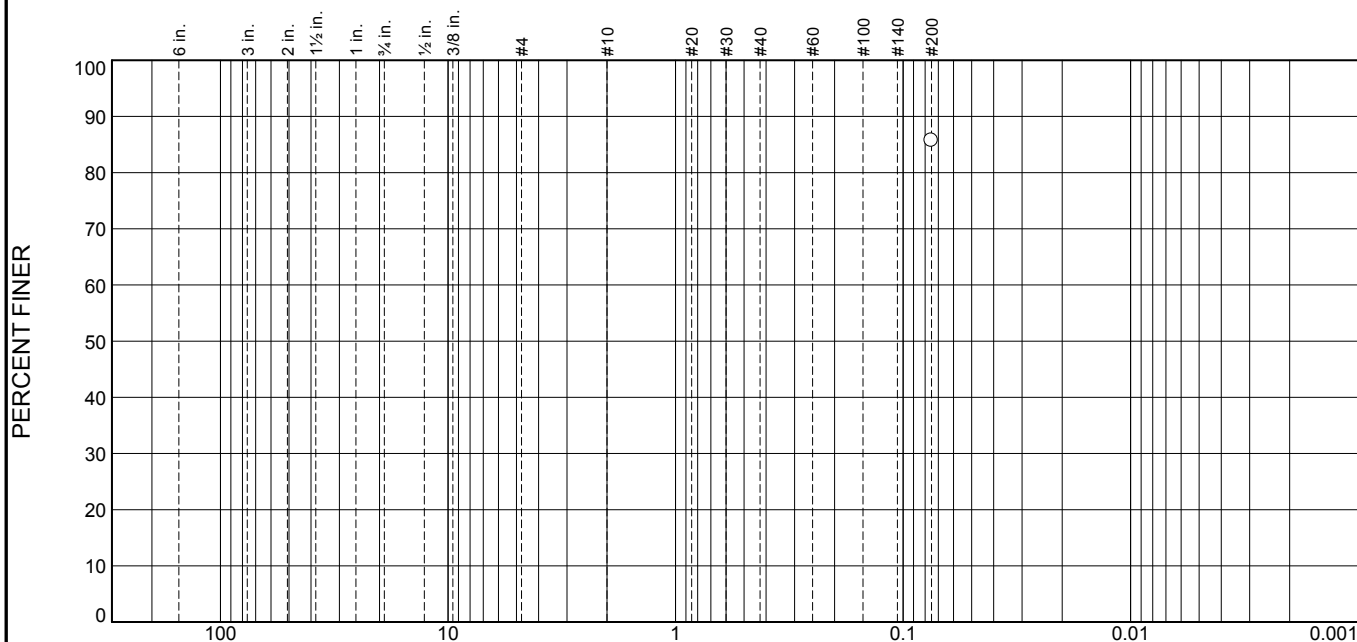Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.7	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	8.7		

(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: CW
Title: PM

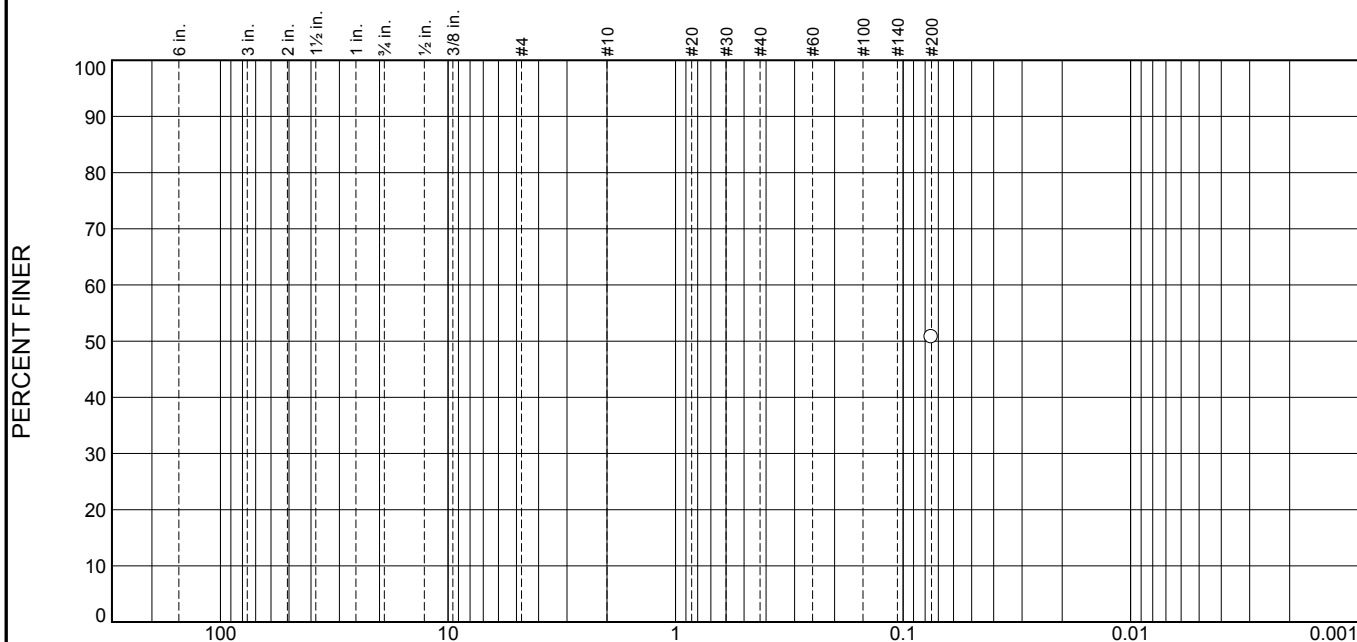Location: S0003R, S10
Sample Number: S36235   Depth: 25-26.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
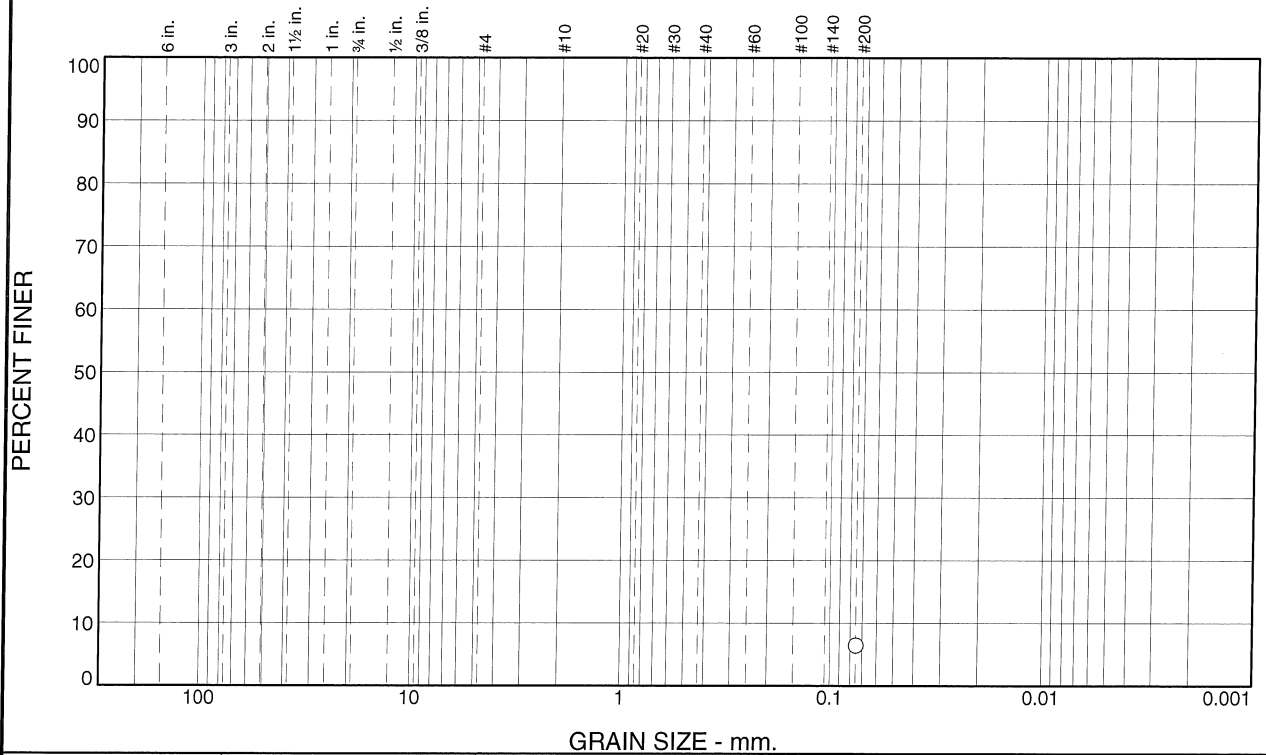
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	6.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: pm

Location: S0003R, S11
Sample Number: S36236   Depth: 30-30.9

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA
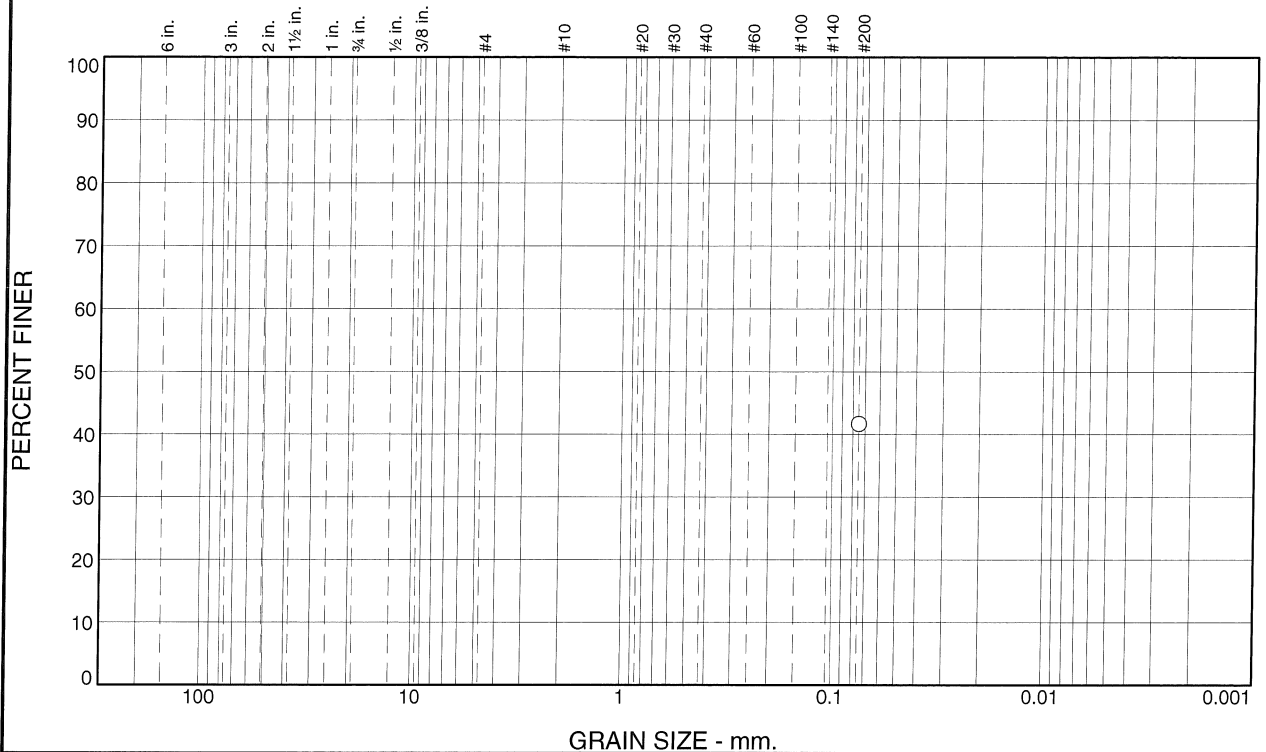
Client: URS / HMM/ ARUP
Project: CA High Speed Train
          Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
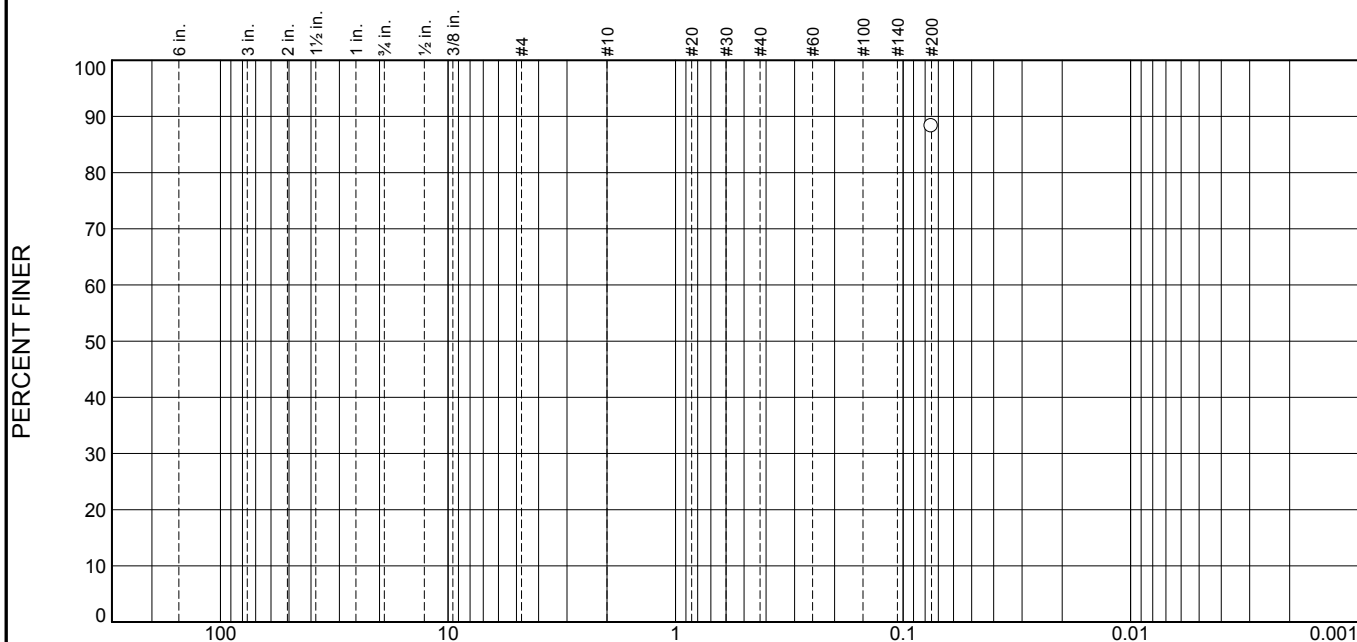
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	88.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 22   LL= 28   PI= 6

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S12
Sample Number: S35521   **Depth:** 35-36.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 13   LL= 17   PI= 4

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S13
Sample Number: S35522   **Depth:** 40-41.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
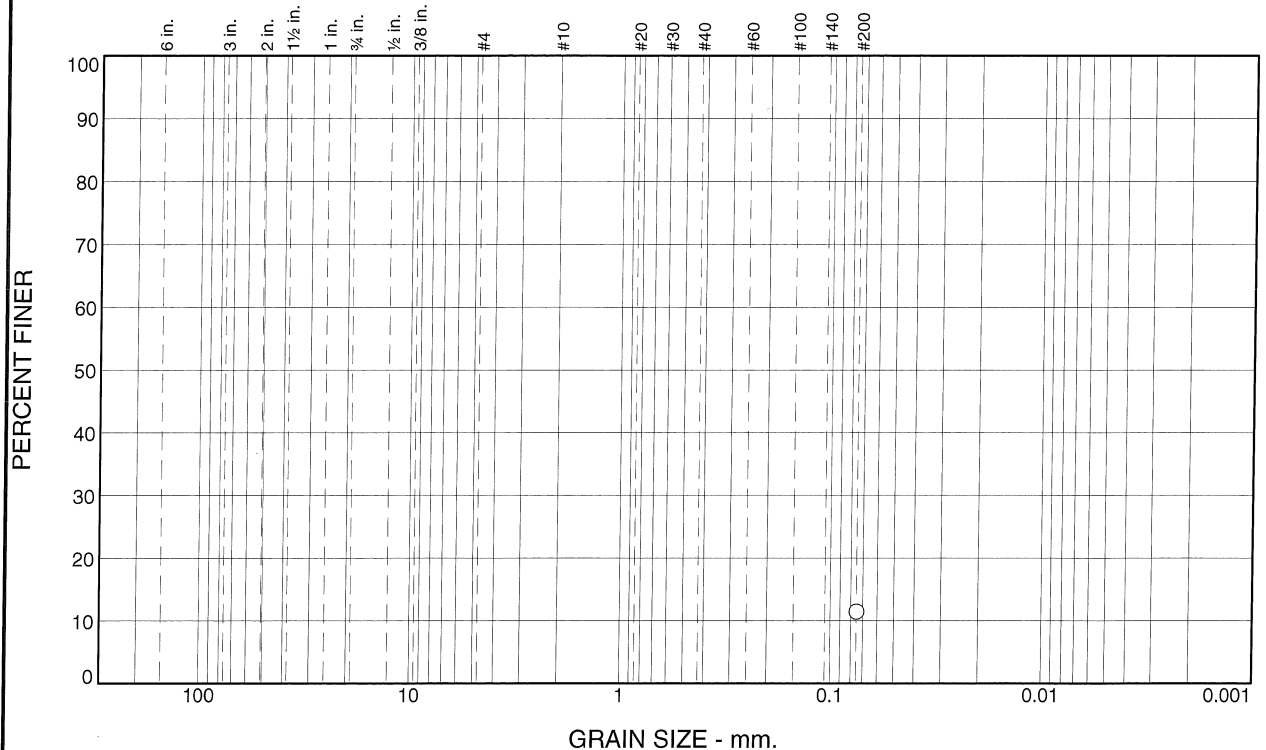
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	11.5		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0003R, S15
Sample Number: S36237   **Depth:** 50-50.8

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						85.7	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	85.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 19   LL= 22   PI= 3

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S16B
Sample Number: S35523   **Depth:** 55.4-56.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	50.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 16   LL= 21   PI= 5

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S17
Sample Number: S35524   Depth: 60-61.5

Date Sampled:

**SIERRA TESTING LABS, INC.
El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

Grain size chart with sieve sizes: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

PERCENT FINER (y-axis: 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						41.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	41.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM
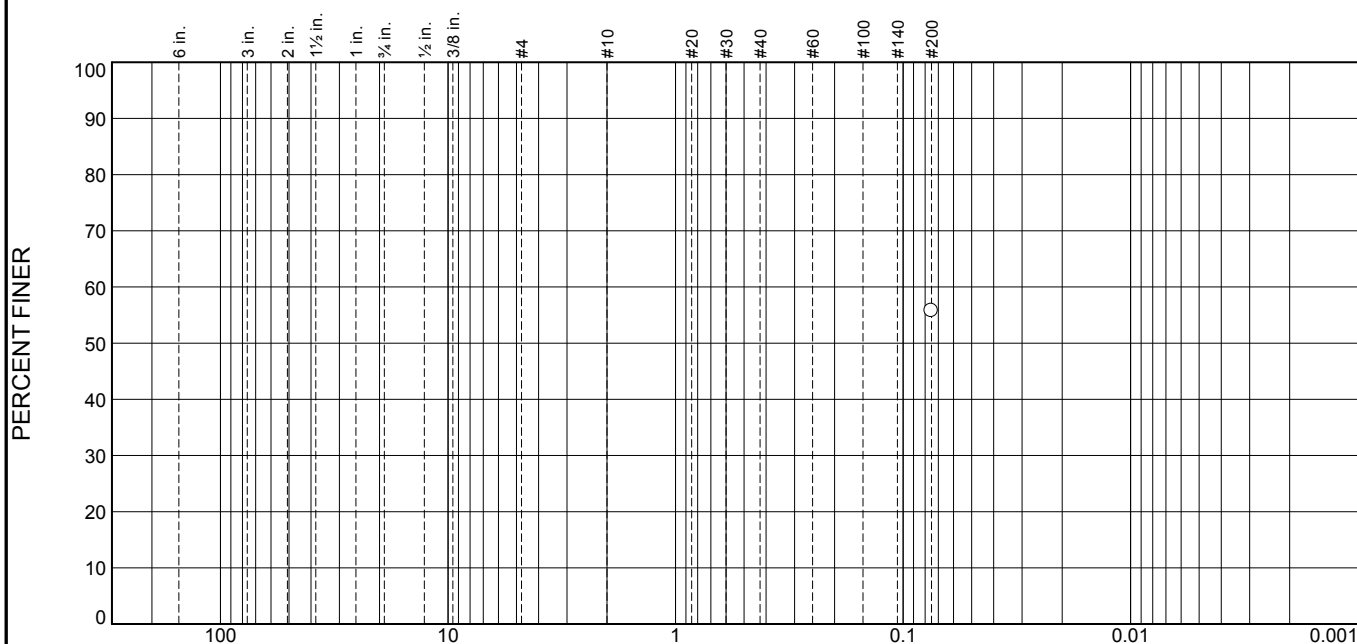
Location: S0003R, S19
Sample Number: S36238   Depth: 70-71.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
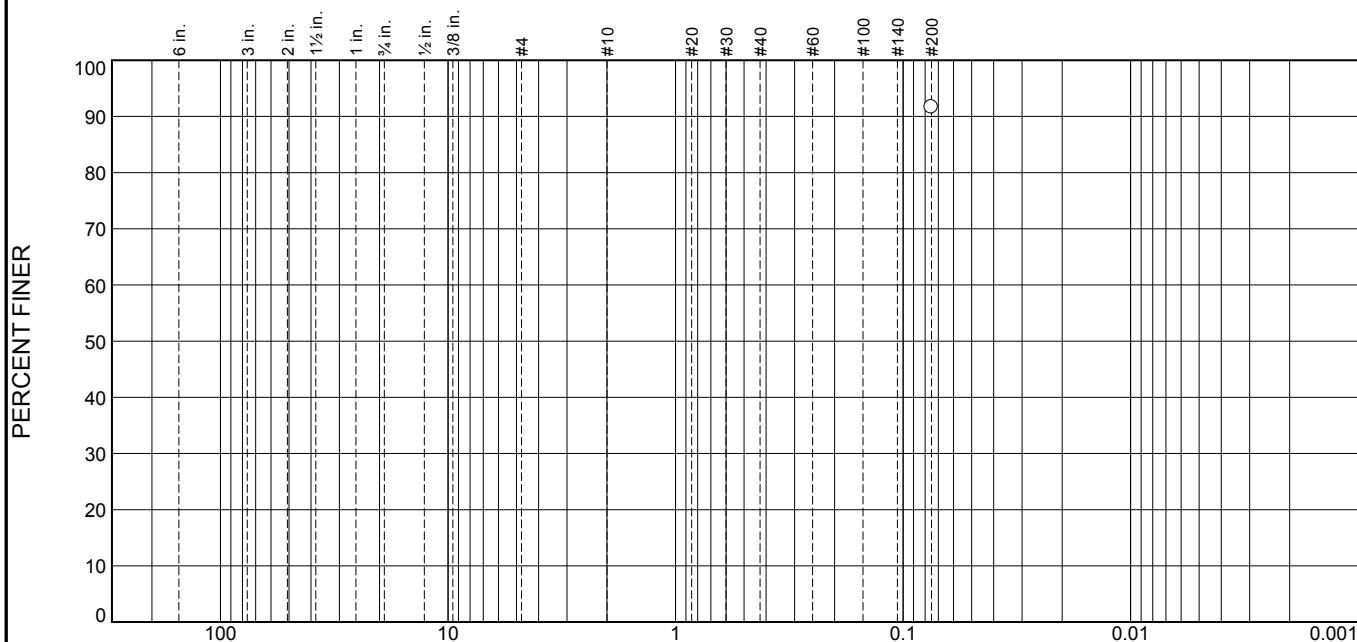
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						91.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	91.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= NP **LL=** NP **PI=** NP

Classification
USCS (D 2487)= **AASHTO (M 145)=**

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11 **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0003R, S20
Sample Number: S35525 **Depth:** 75-76.5
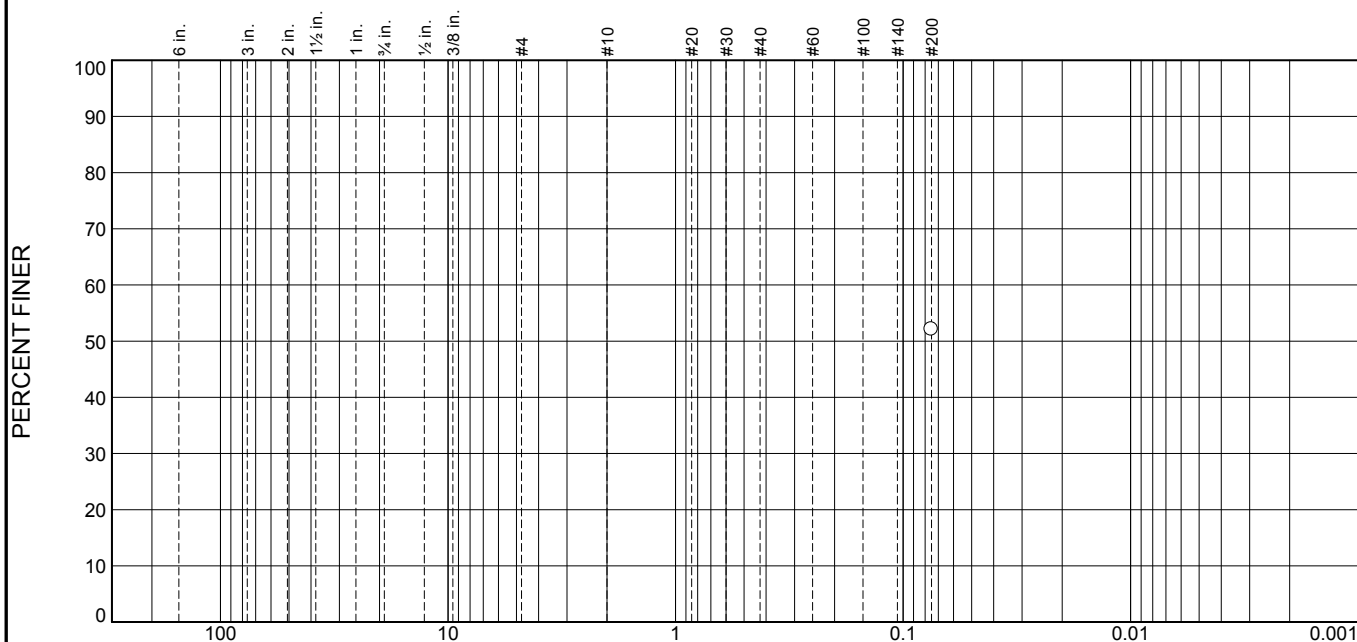
Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111 **Figure**

Particle Size Distribution Report
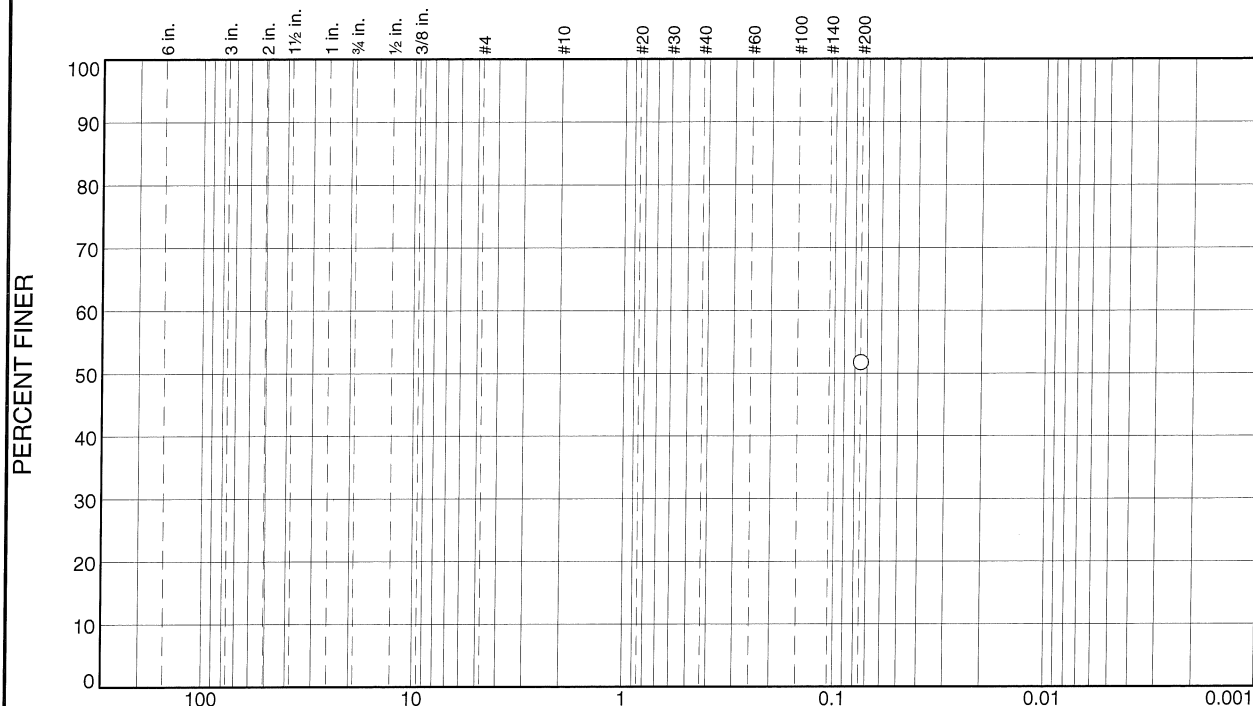
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	51.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0004R, S01
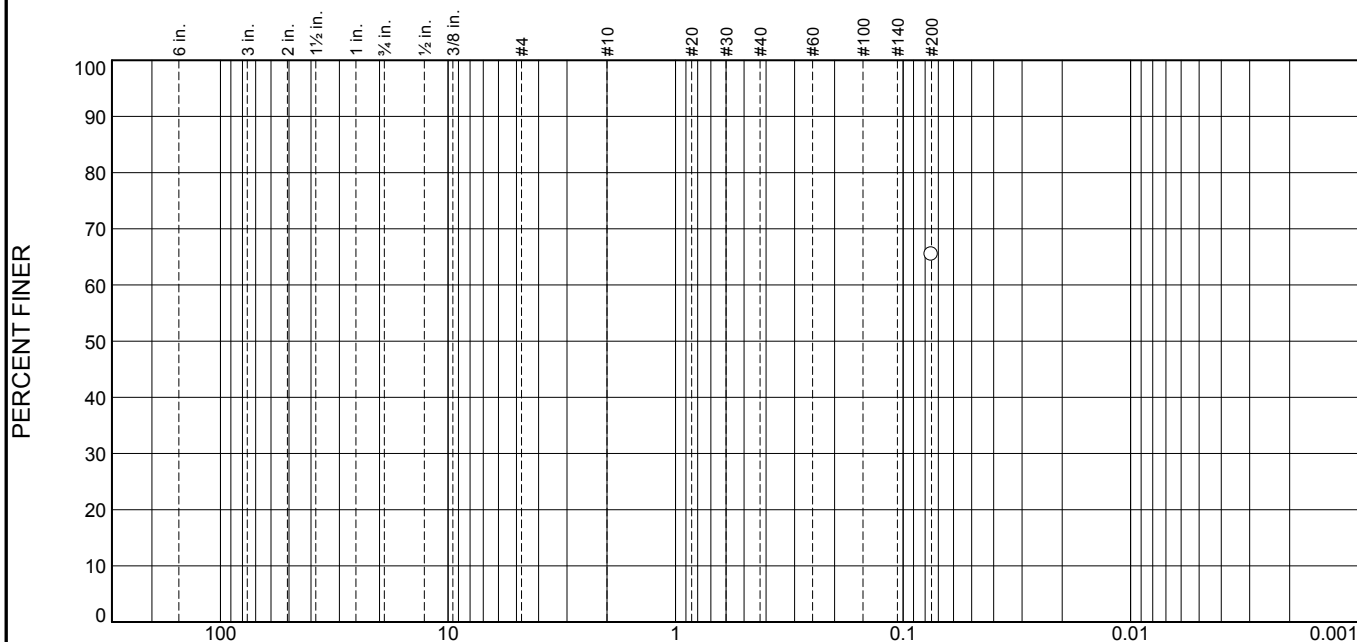**Sample Number:** S36239   **Depth:** 0-5.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes marked: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200
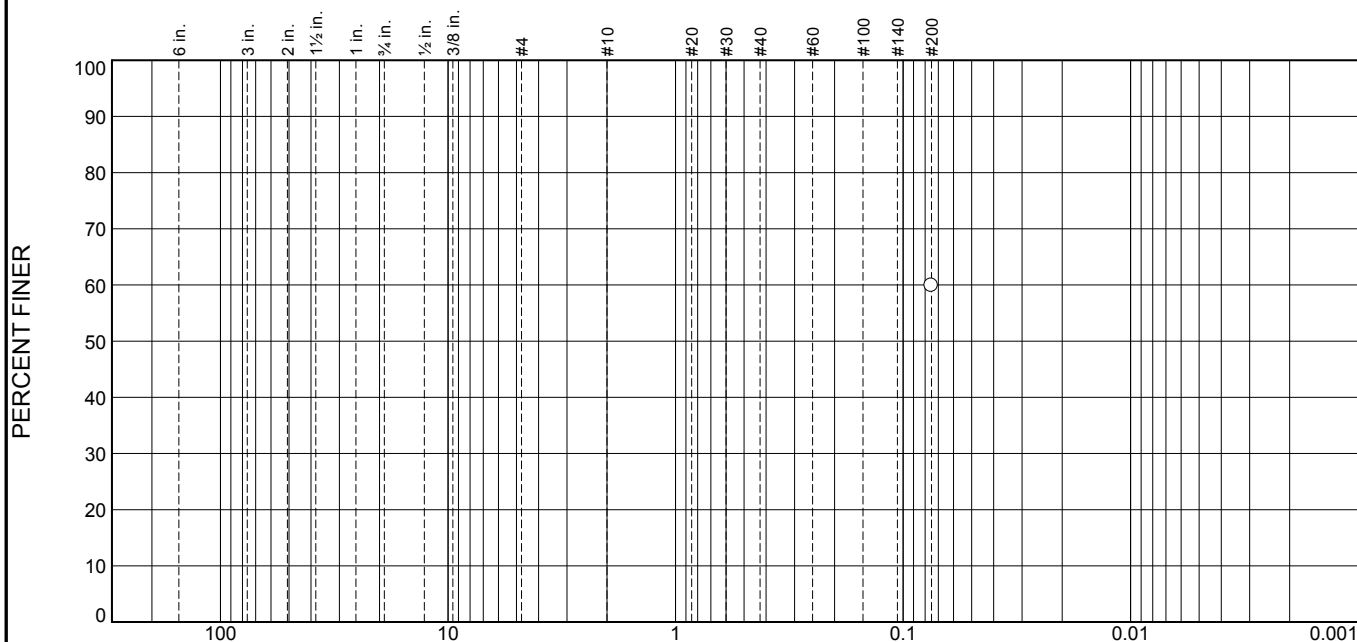
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 26   LL= 27   PI= 1

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: ts
Title: PM

Location: S0004R, S03
Sample Number: S35526   **Depth:** 6.5-7.9

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
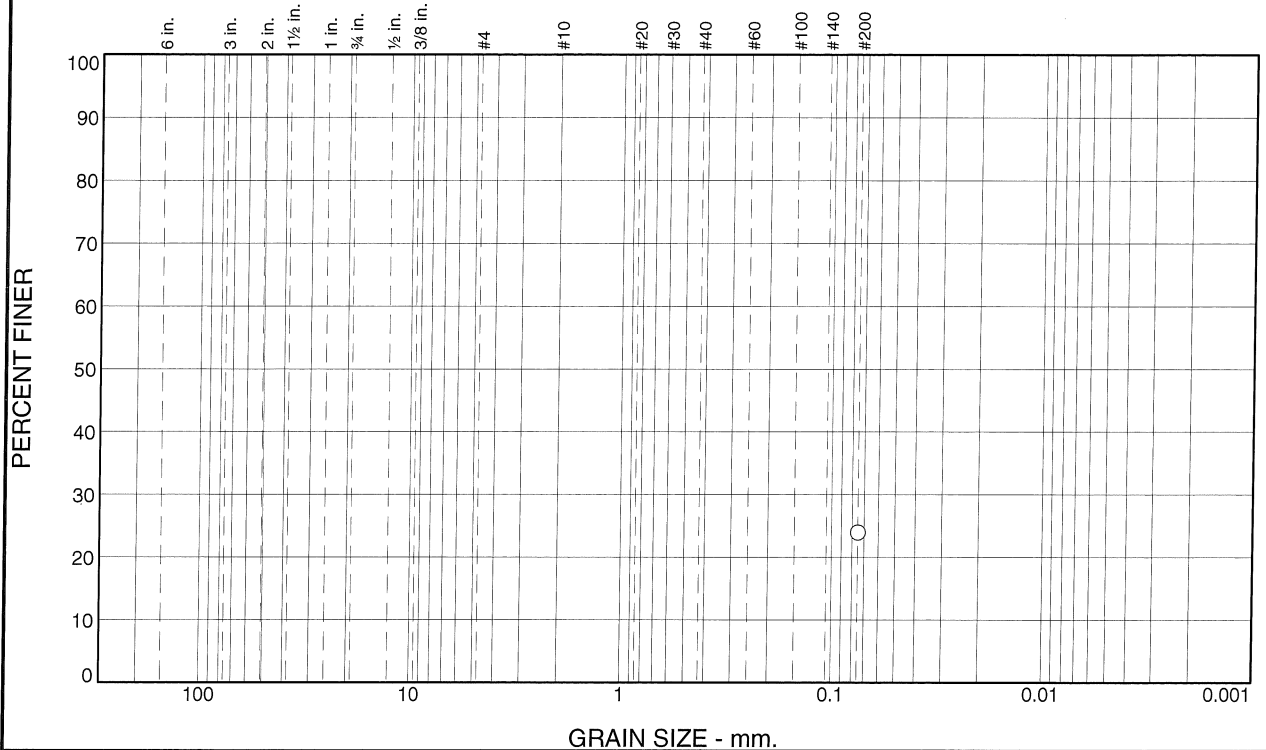
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						24.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	24.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0004R, S04
Sample Number: S36240   **Depth:** 8-9.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER / GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						55.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	55.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 17   LL= 25   PI= 8

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0004R, S05A
Sample Number: S35527   Depth: 9.5-10.5

Date Sampled:

SIERRA TESTING LABS, INC.
**El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve labels (top): 6 in. 3 in. 2 in. 1½ in. 1 in. ¾ in. ½ in. 3/8 in. #4 #10 #20 #30 #40 #60 #100 #140 #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	52.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 15   LL= 17   PI= 2

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0004R, S06B

Sample Number: S35528   **Depth:** 11.6-12.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 15   LL= 19   PI= 4

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D90=	D85=	D60=
D50=	D30=	D15=
D10=	Cu=	Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0004R, S07

**Sample Number:** S35529   **Depth:** 12.5-13.1

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA	**Client:** URS / HMM/ ARUP **Project:** CA High Speed Train Fresno to Bakersfield Geotech Investigation **Project No:** 11-111 **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.
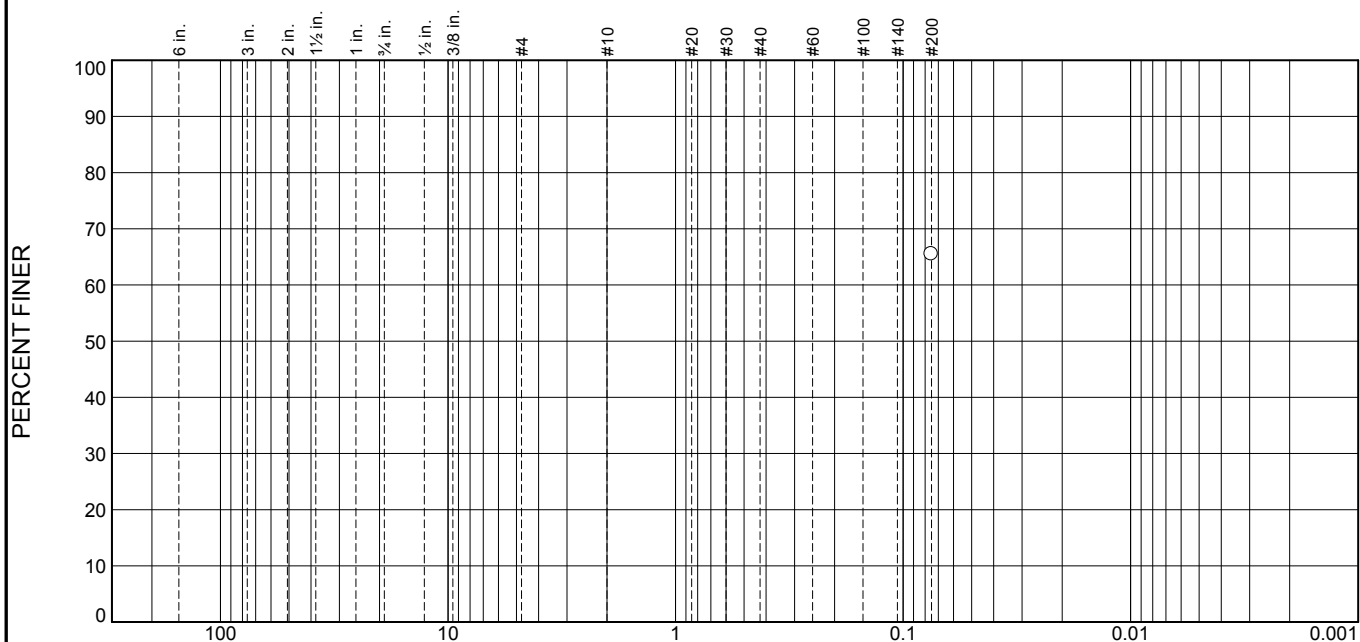
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 17   LL= 19   PI= 2

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0004R, S08
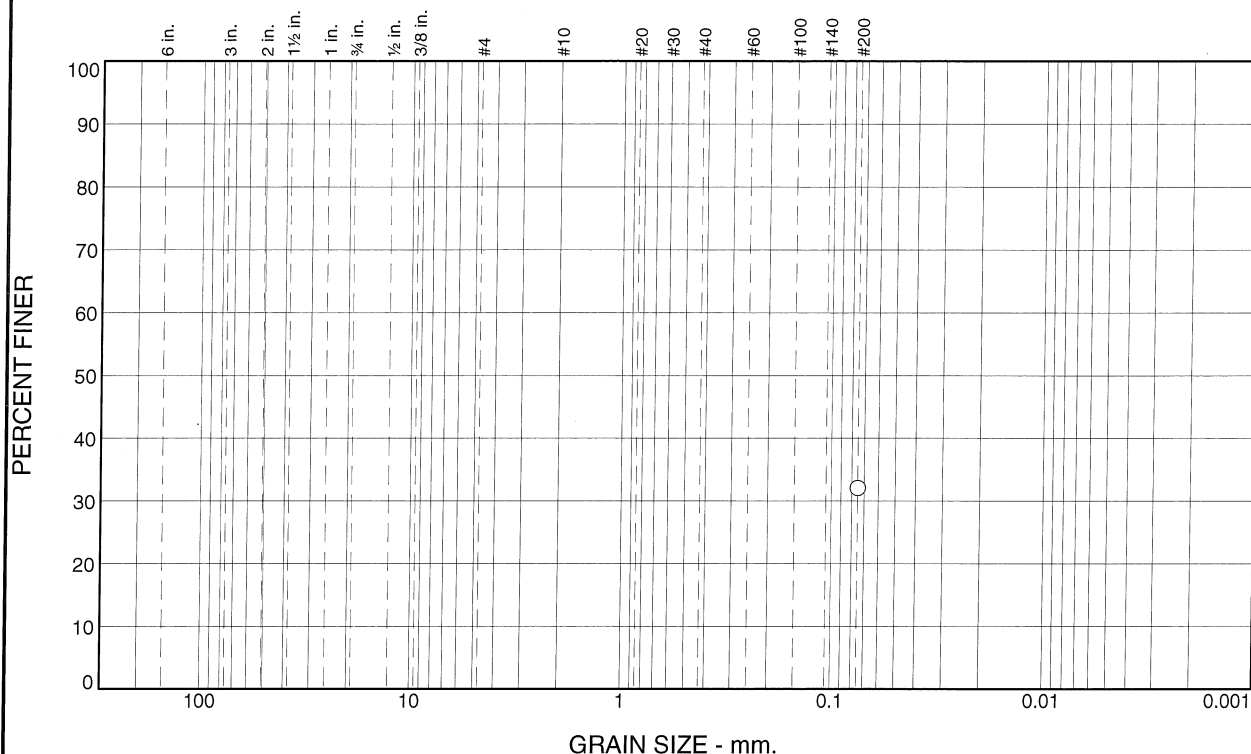Sample Number: S35530   Depth: 14-15.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
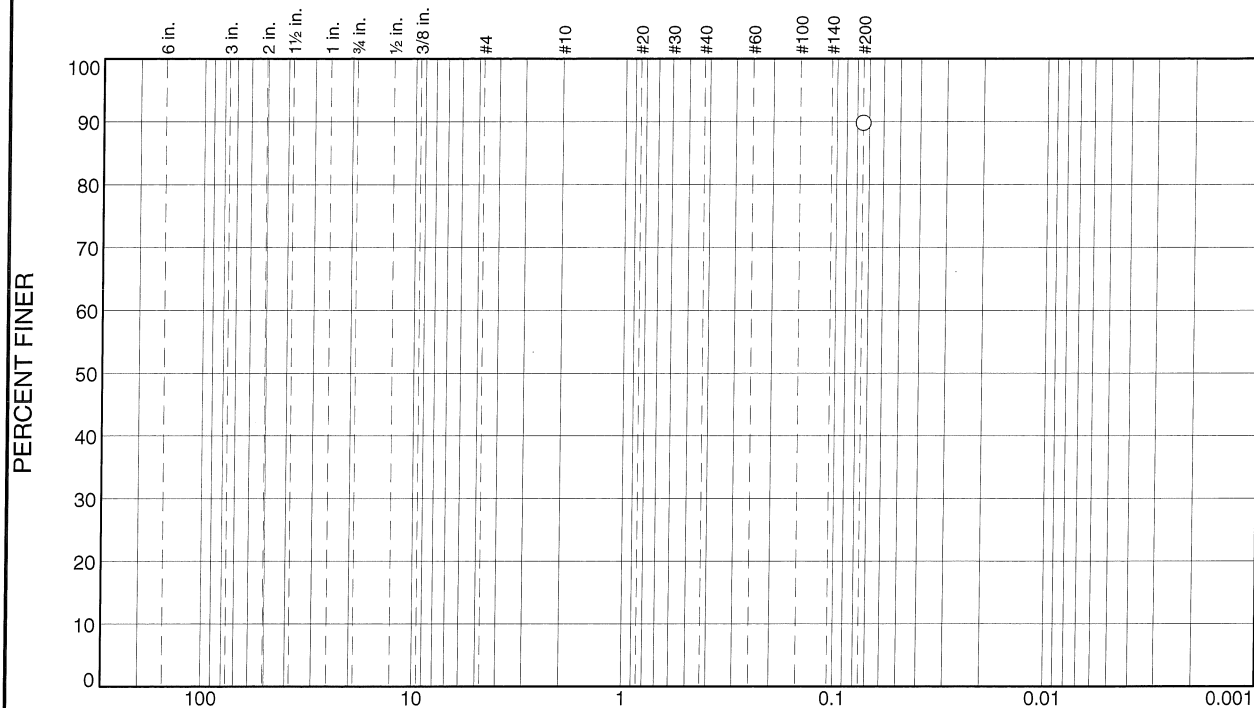
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						89.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	89.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0004R, S09
Sample Number: S36241   **Depth:** 20-21.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.
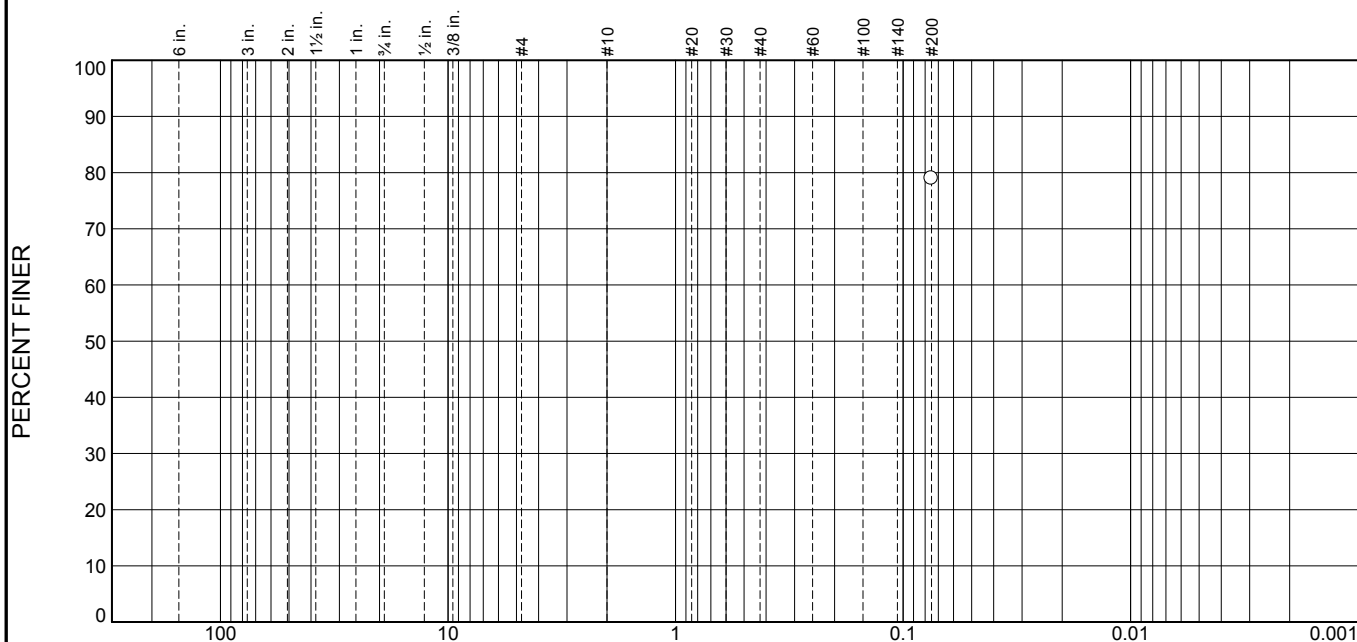
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	79.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0004R, S10B
Sample Number: S35531   **Depth:** 25.6-25.9

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
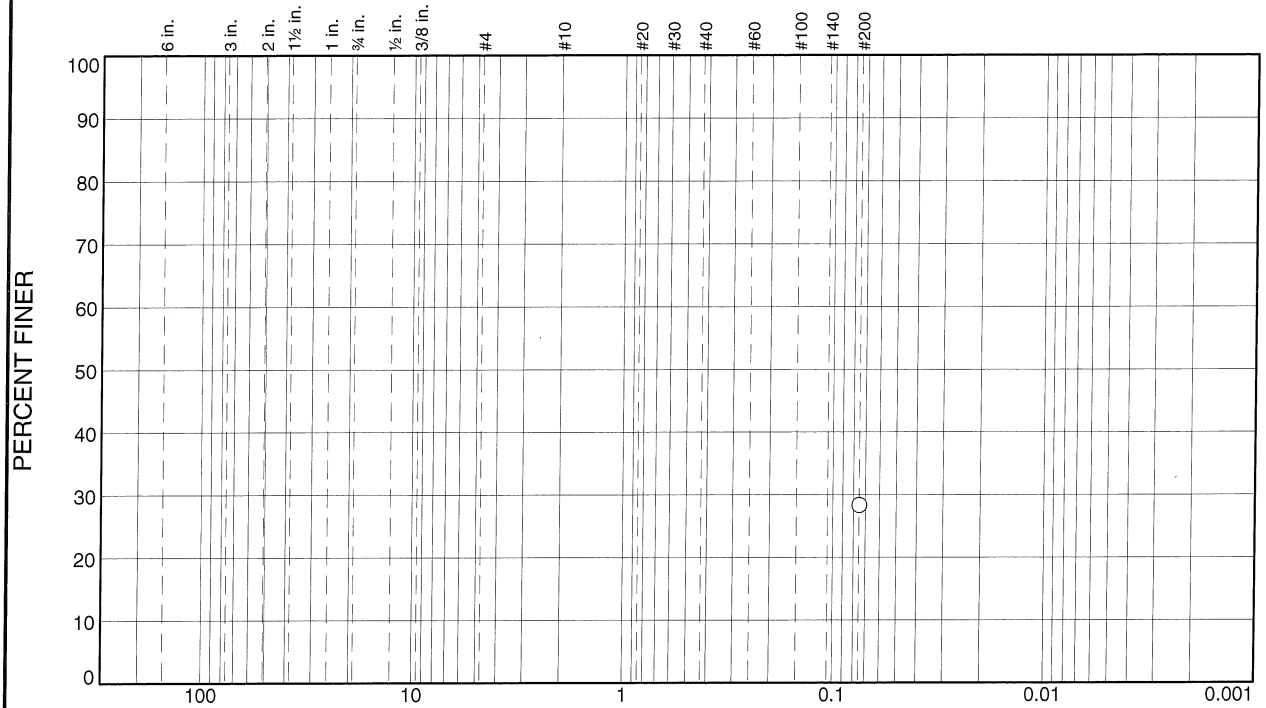
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						28.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	28.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= LL= PI=

Classification
USCS (D 2487)= AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0004R, S11
Sample Number: S36242   Depth: 30-31.4

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA
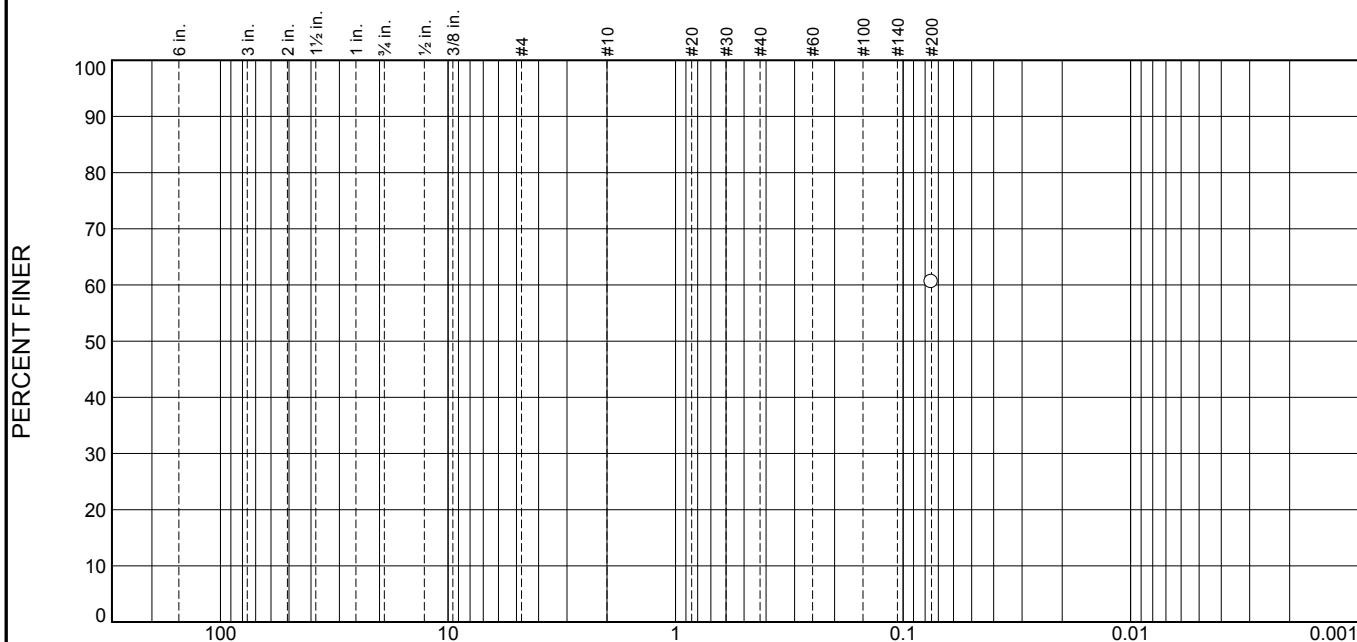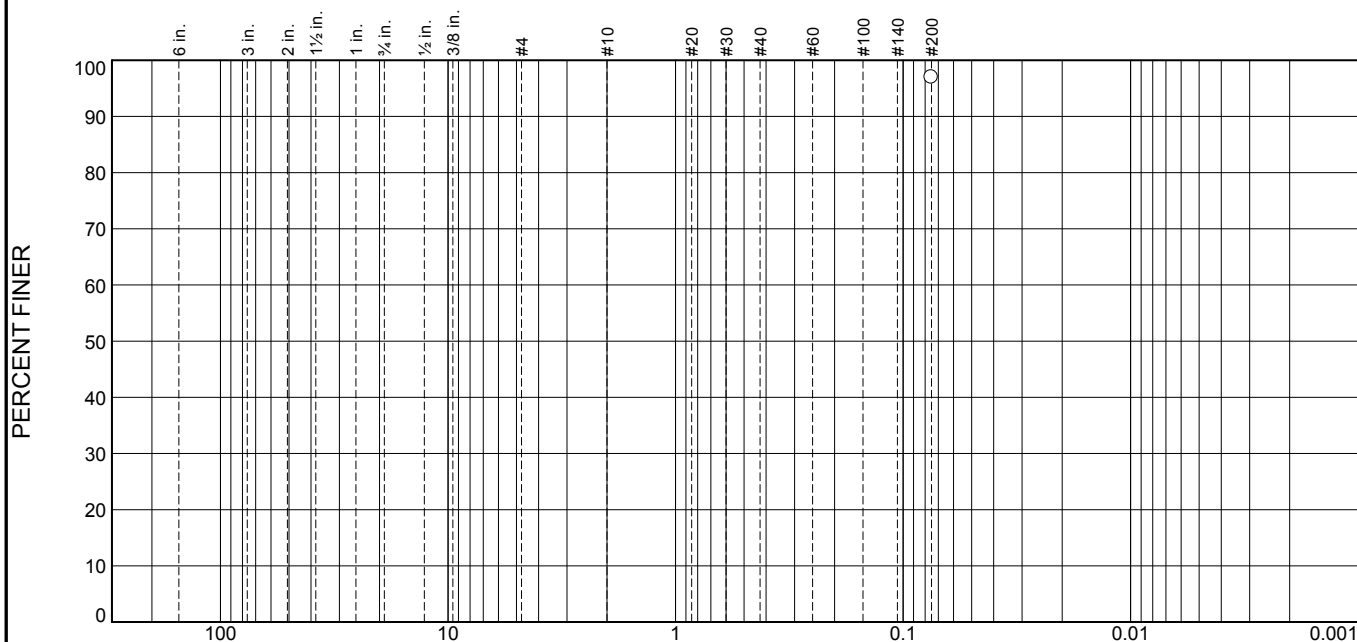
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						32.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	32.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0004R, S12
Sample Number: S36243   **Depth:** 35-36.3
Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
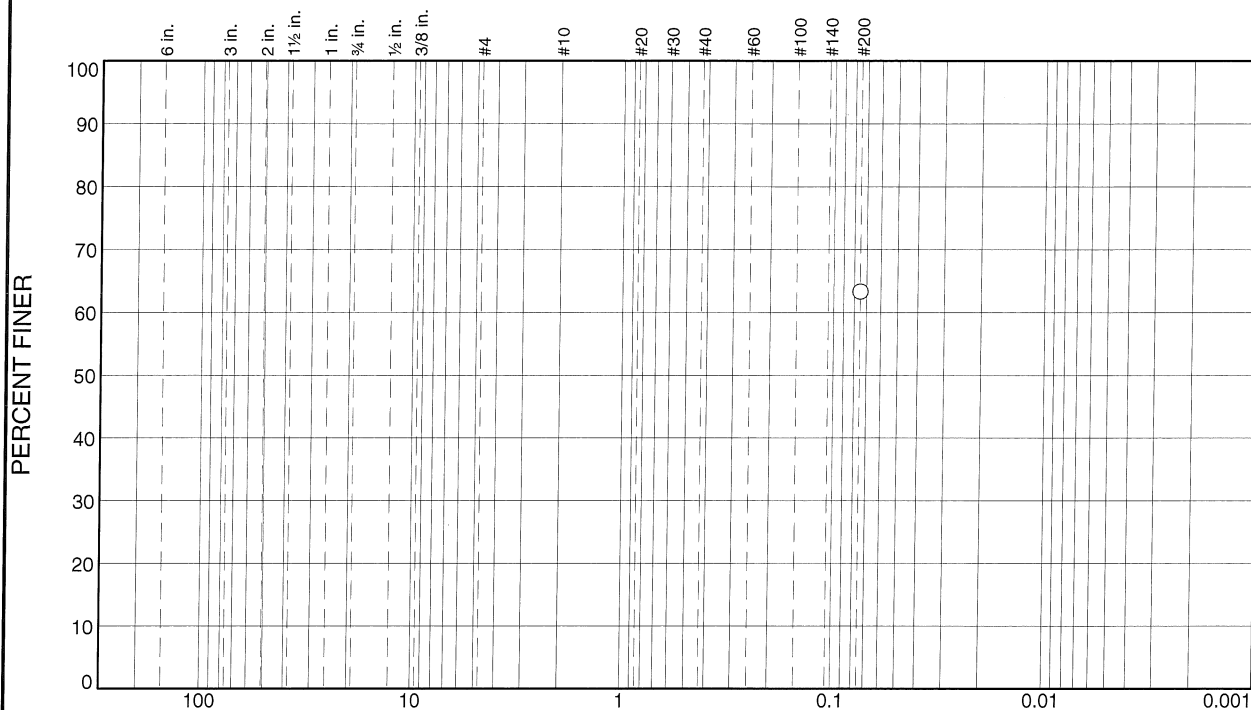
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	63.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0004R, S13
Sample Number: S36244   Depth: 40-41.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER (y-axis, 0 to 100)

GRAIN SIZE - mm. (x-axis)

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	60.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 17   LL= 22   PI= 5

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0004R, S14
**Sample Number:** S35532   **Depth:** 45-45.9

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						96.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	96.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　　$D_{85}=$　　　　　$D_{60}=$
$D_{50}=$　　　　　$D_{30}=$　　　　　$D_{15}=$
$D_{10}=$　　　　　$C_u=$　　　　　$C_c=$

Remarks

Date Received: 11/1/11　　　**Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0004R, S17B
**Sample Number:** S35533　　　**Depth:** 53.9-54.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　**Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.
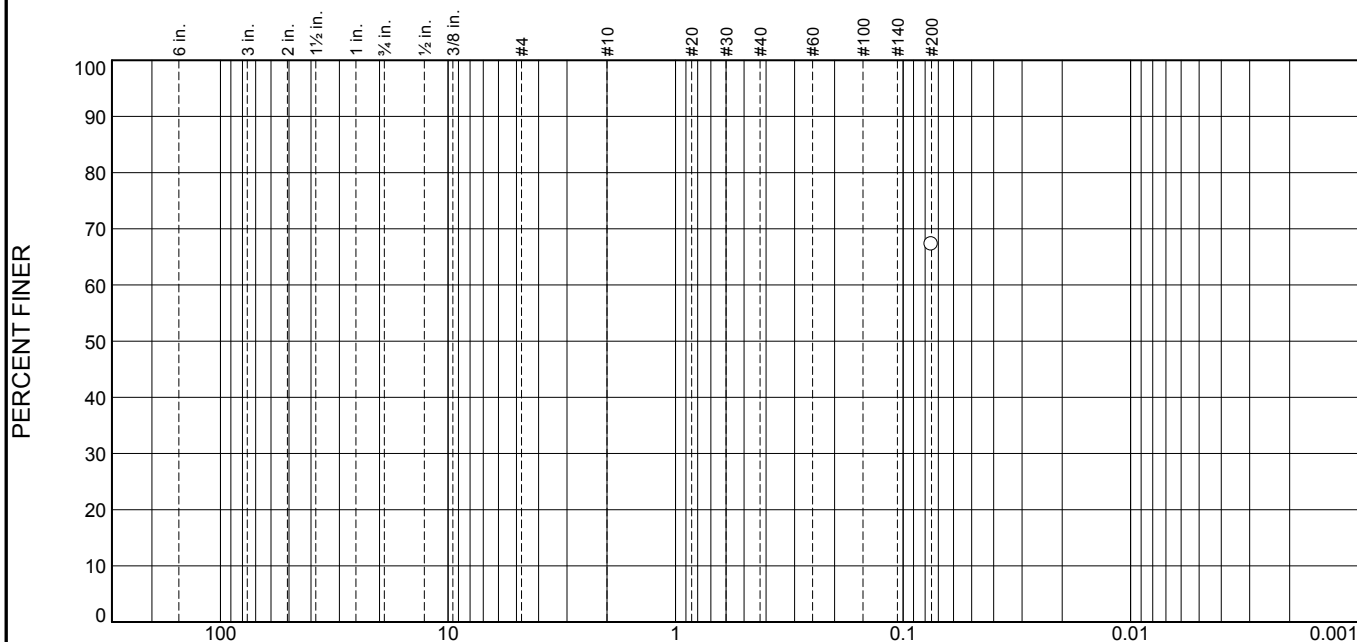
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						67.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	67.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 19   LL= 26   PI= 7

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0004R, S20B

Date Sampled:

Sample Number: S35535   **Depth:** 65.2-66.3

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
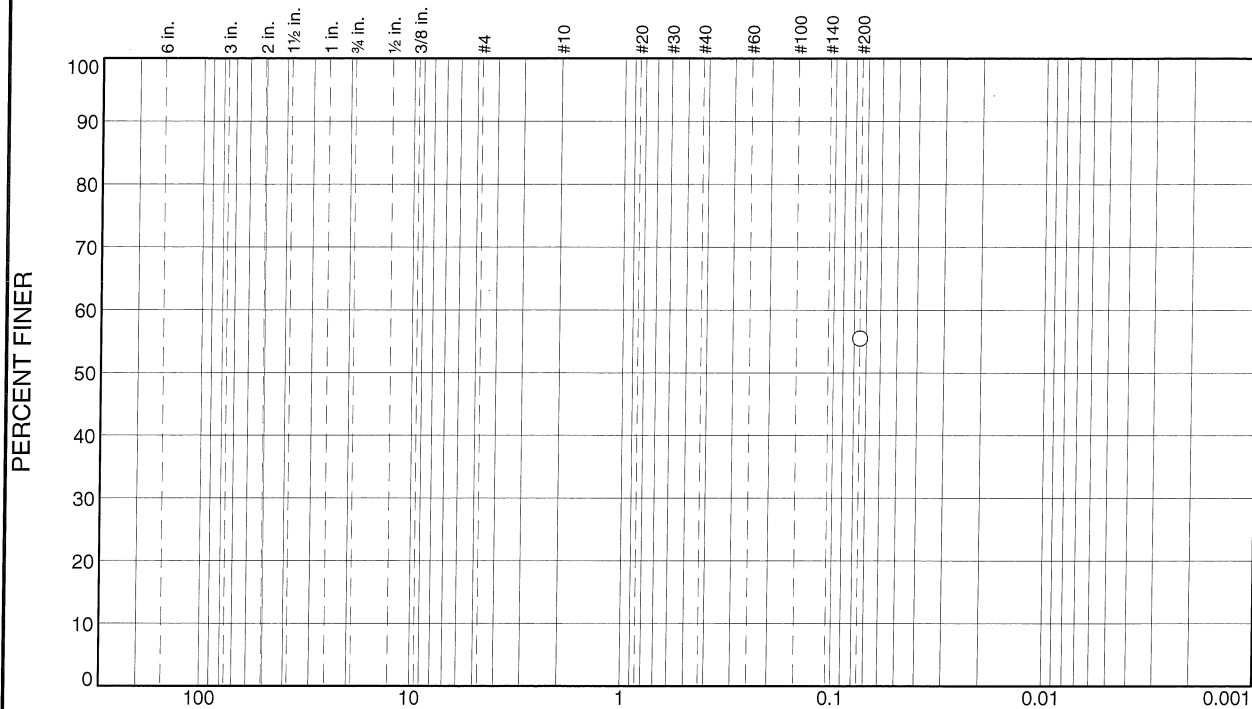
GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						55.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	55.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 25   LL= 33   PI= 8

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0004R, S21
Sample Number: S35536   Depth: 70-70.9

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
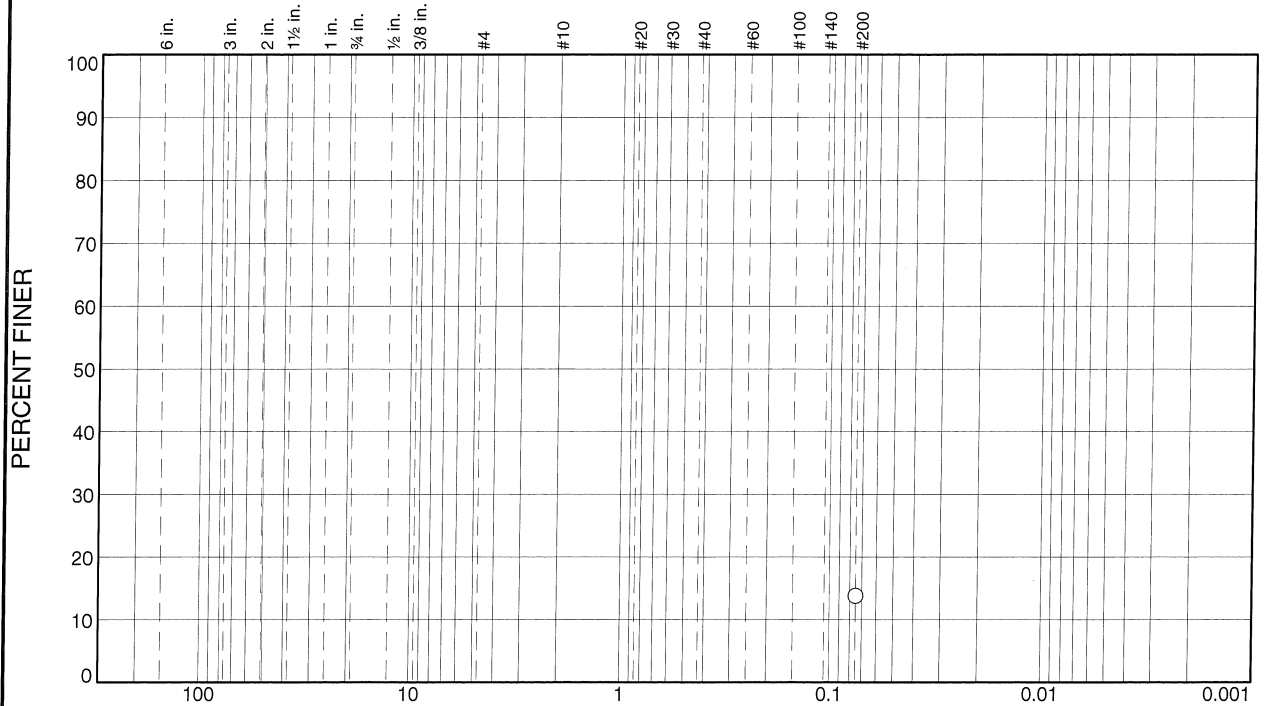
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						13.8	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	13.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=　　　　　LL=　　　　　PI=

Classification

USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients

$D_{90}=$　　　$D_{85}=$　　　$D_{60}=$
$D_{50}=$　　　$D_{30}=$　　　$D_{15}=$
$D_{10}=$　　　$C_u=$　　　$C_c=$

Remarks

Date Received: 11/16/11　　　Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0005R, S02
Sample Number: S36246　　　Depth: 5-6.5

Date Sampled:

SIERRA TESTING LABS, INC.
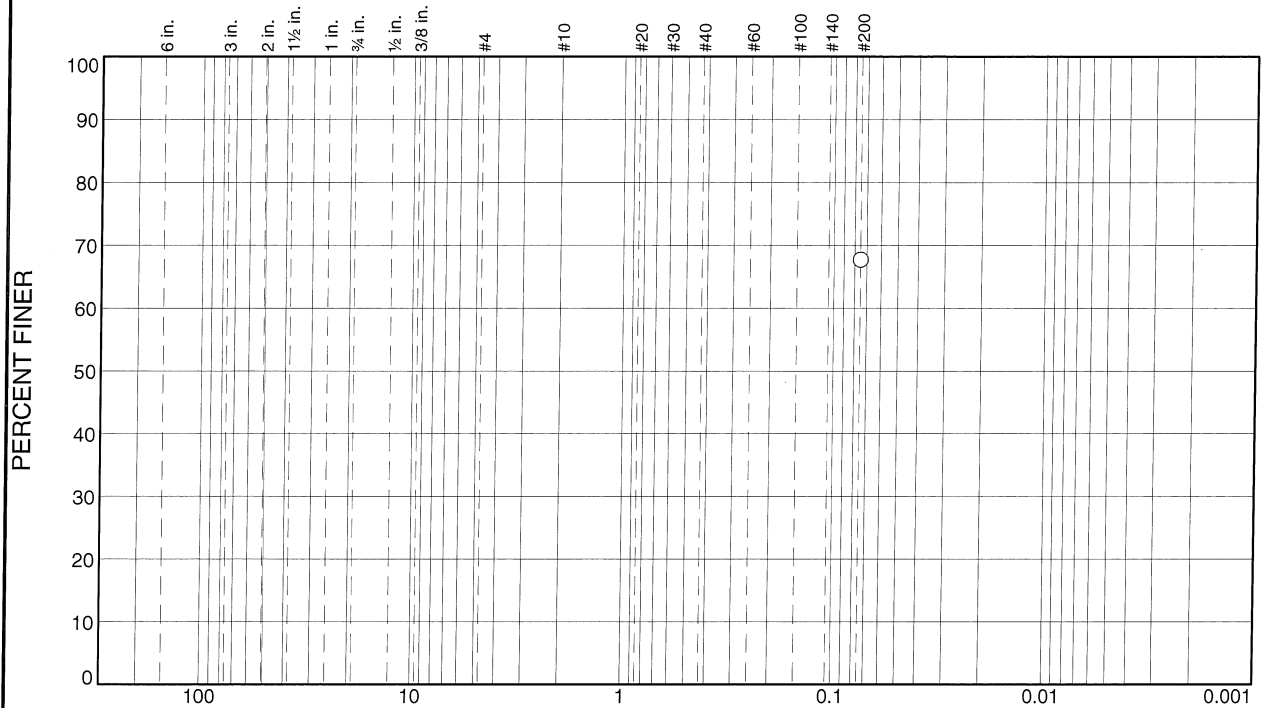## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111　　　Figure

Particle Size Distribution Report
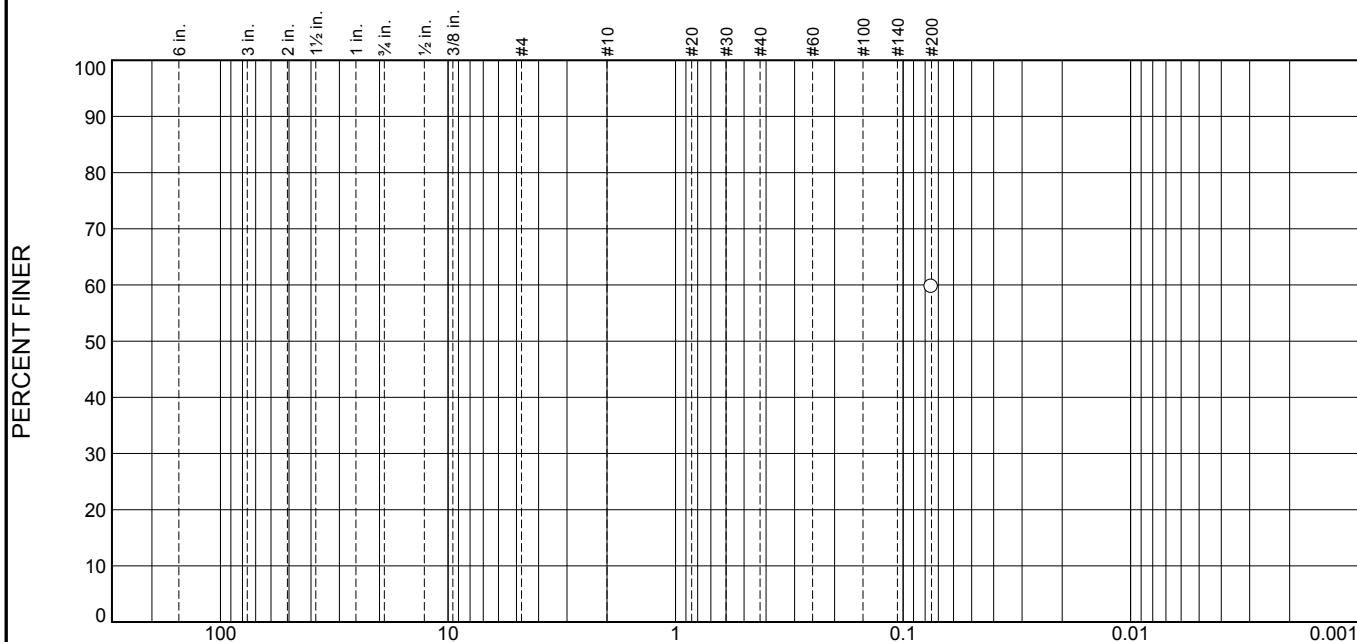
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 22   LL= 26   PI= 4

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: js
Title: PM

Location: S0005R, S05
**Sample Number:** S35537   **Depth:** 9.5-11.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
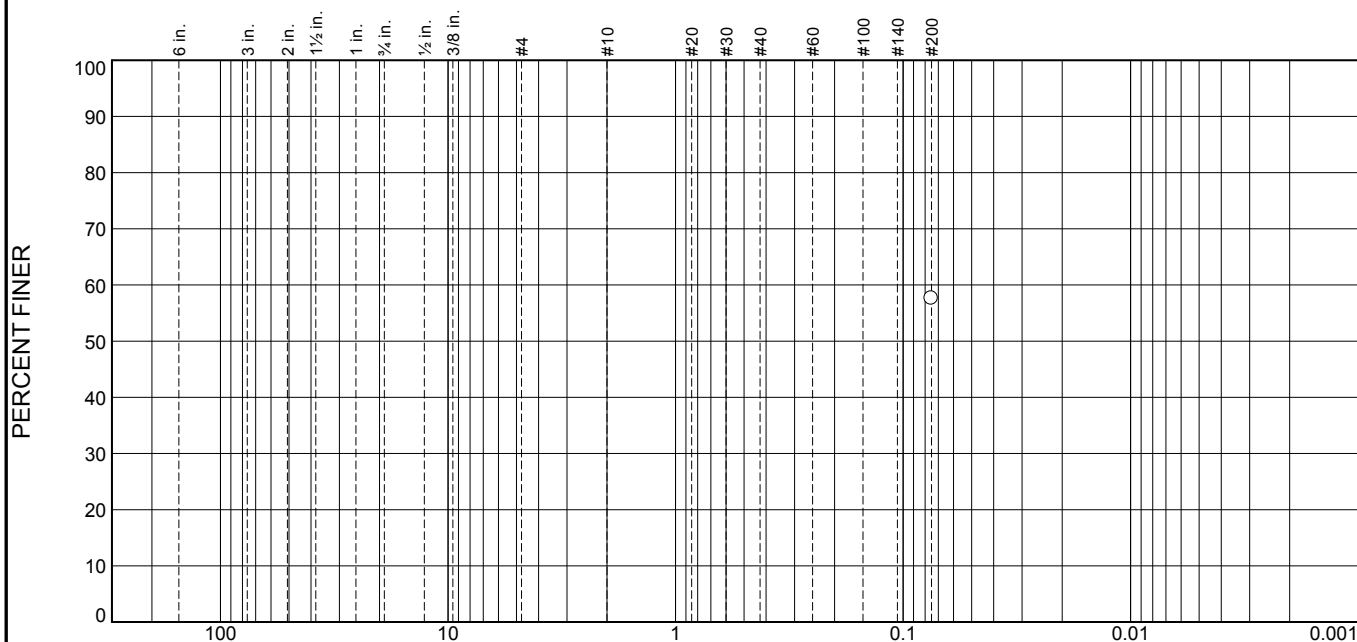
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						57.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	57.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 20   LL= 23   PI= 3

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: js
Title: PM

Location: S0005R, S06
Sample Number: S35538   **Depth:** 11-12.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						67.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	67.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 18   LL= 23   PI= 5

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ac

Checked By: js

Title: PM

* (no specification provided)

Location: S0005R, S07
Sample Number: S35539   **Depth:** 12.5-13.3

Date Sampled:

SIERRA TESTING LABS, INC.
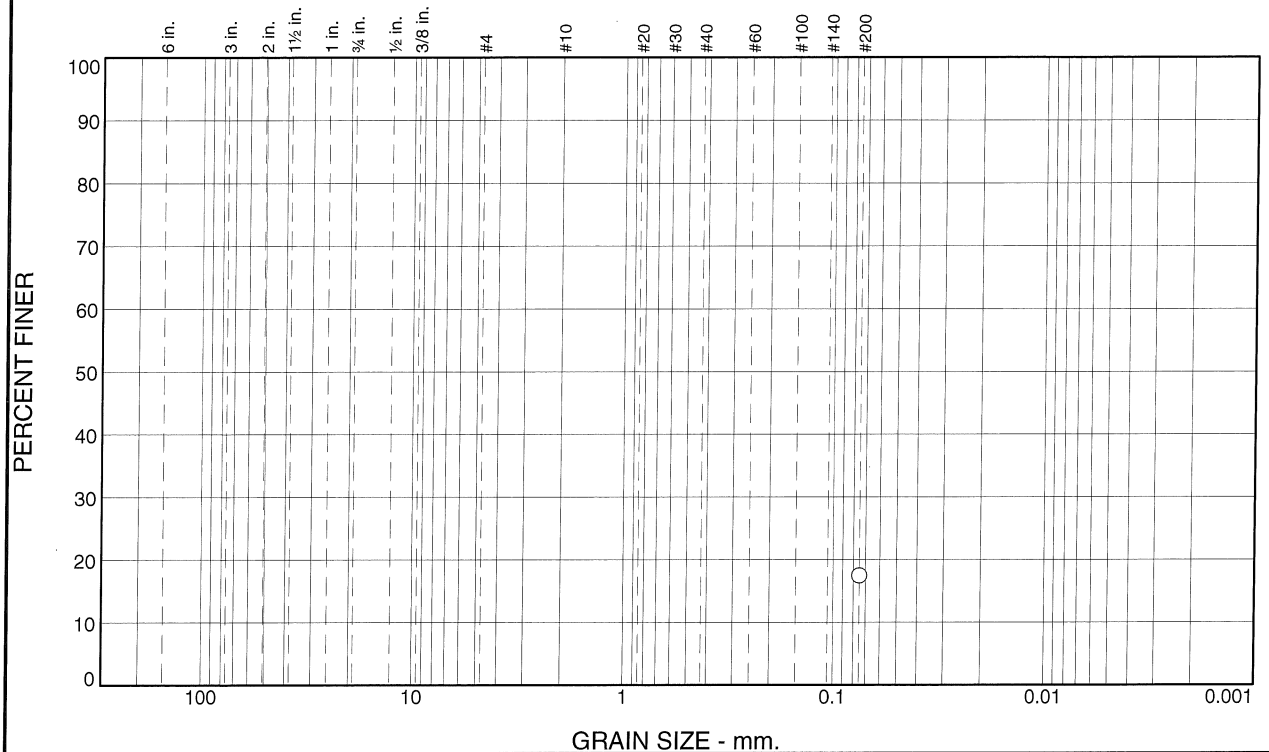## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
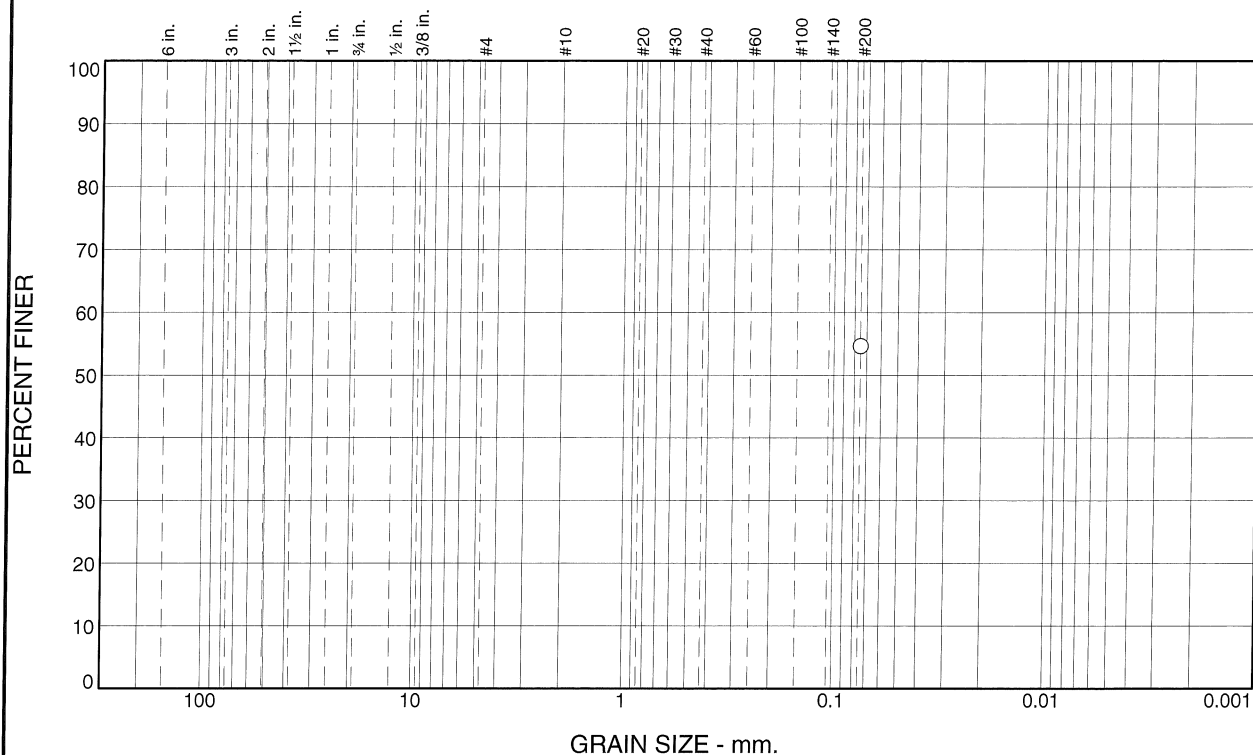
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	54.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

* (no specification provided)

Location: S0005R, S08
Sample Number: S36247   Depth: 14-14.5

Date Sampled:

**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						17.5	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	17.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0005R, S09
Sample Number: S36248   Depth: 20-20.8

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
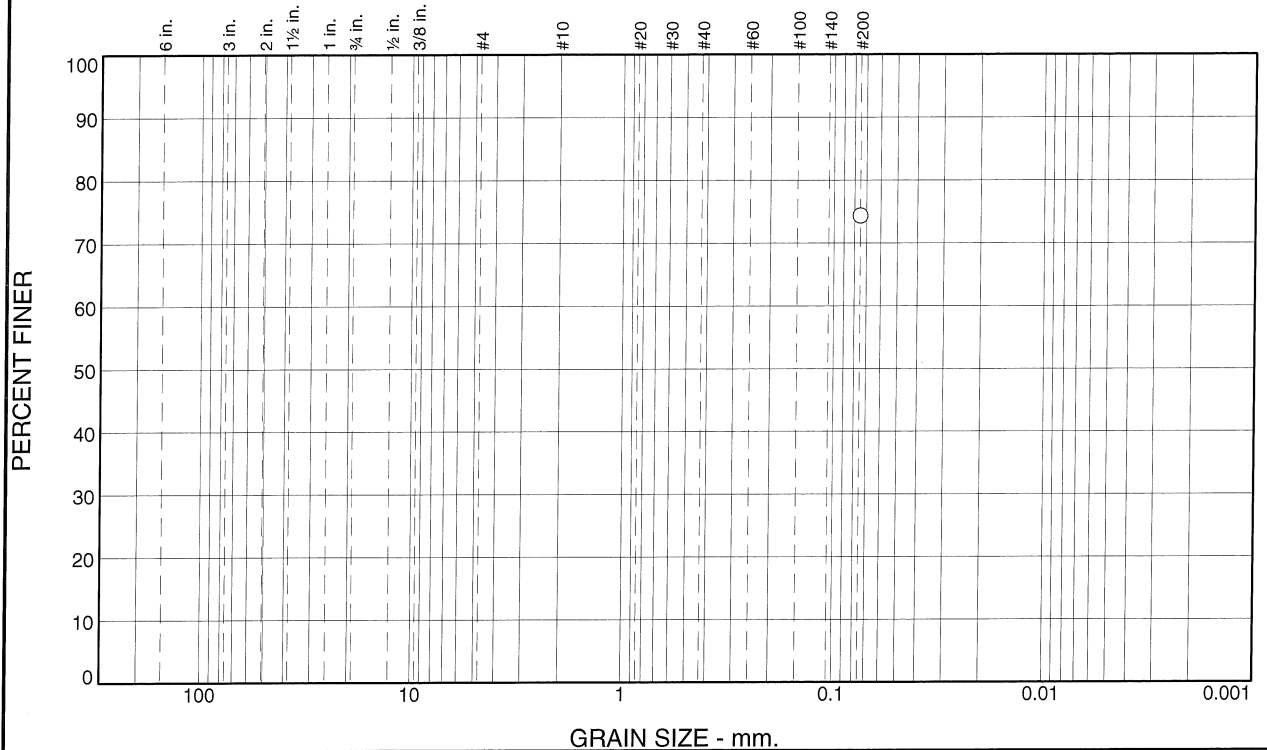
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	74.4		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 18   LL= 25   PI= 7

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: js

Title: PM

* (no specification provided)

Location: S0005R, S11B
Sample Number: S35540   Depth: 30.6-31.5

Date Sampled:

SIERRA
TESTING LABS, INC.
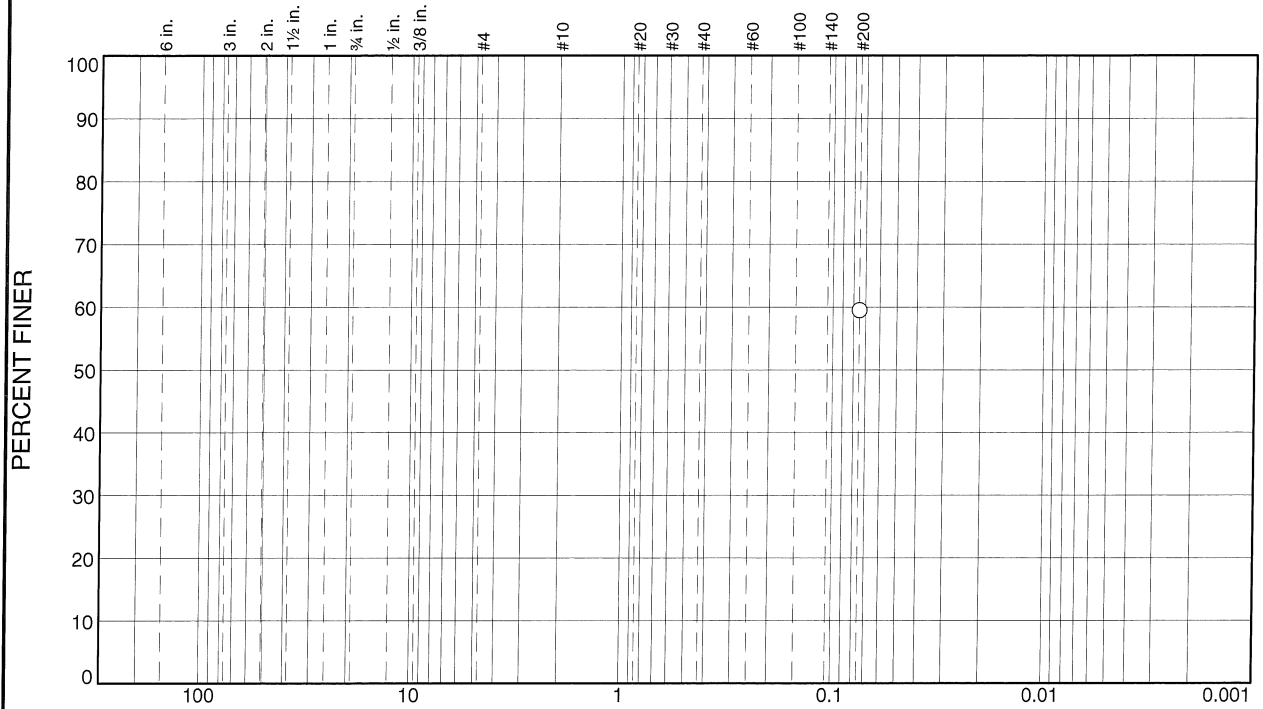## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
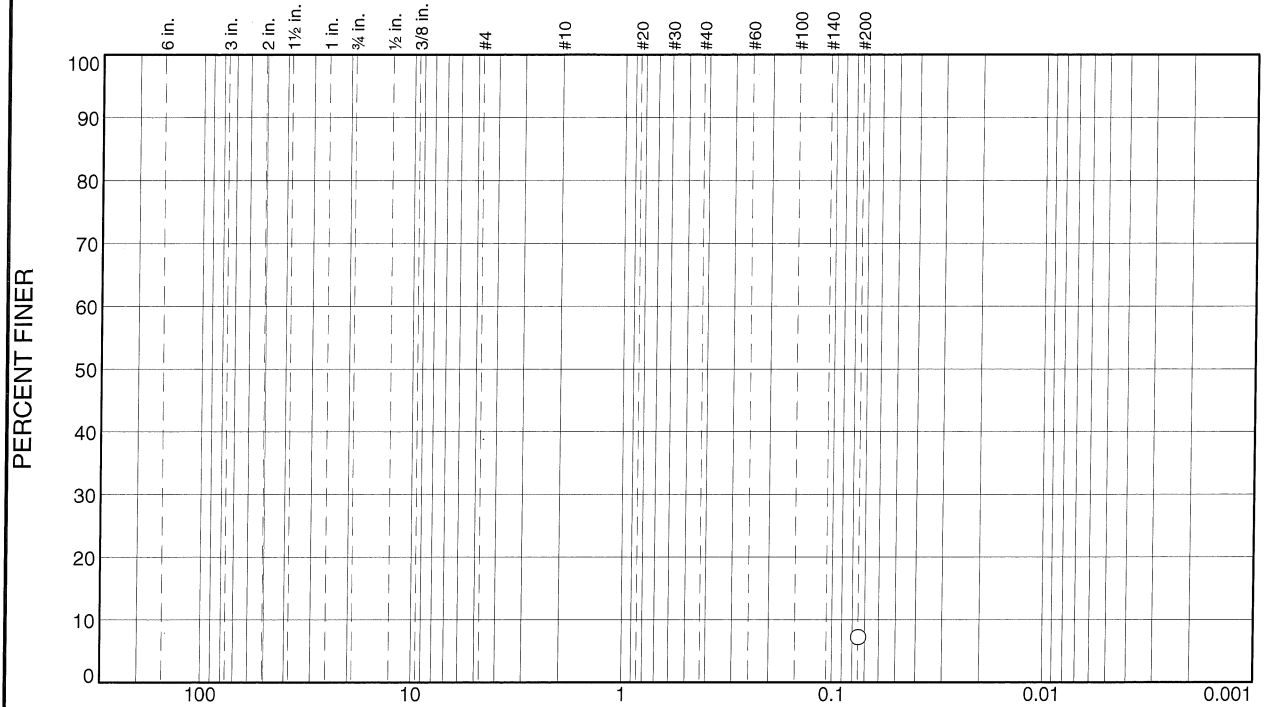
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	7.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0005R, S12

Sample Number: S36250   Depth: 35-36.2

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.5	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 27   LL= 33   PI= 6

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: js

Title: PM

Location: S0005R, S13
Sample Number: S35541   **Depth:** 40-41.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
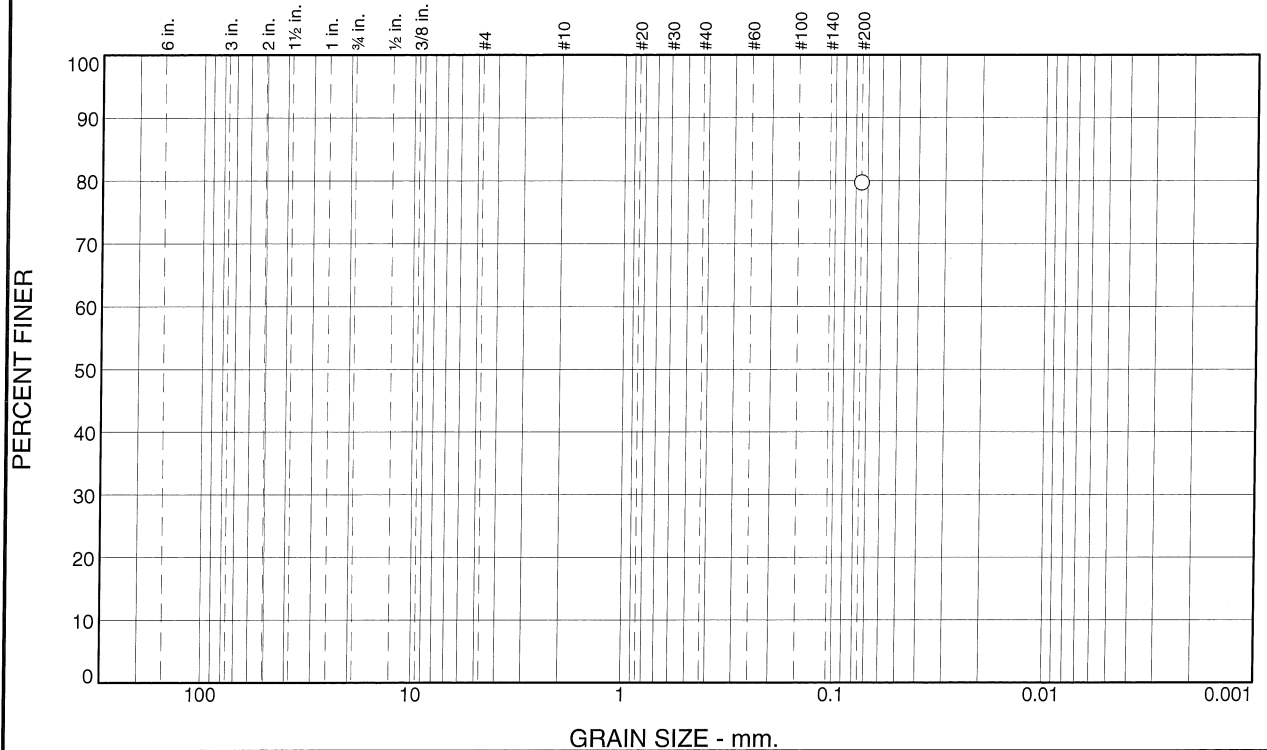
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	79.7		

Material Description

Atterberg Limits (ASTM D 4318)

PL= 27　　　　　LL= 36　　　　　PI= 9

Classification

USCS (D 2487)=　　　　AASHTO (M 145)=

Coefficients

$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11

Tested By: ac

Checked By: js

Title: PM

* (no specification provided)

Location: S0005R, S14
Sample Number: S35542　　　Depth: 45-46.5

Date Sampled:

SIERRA TESTING LABS, INC.
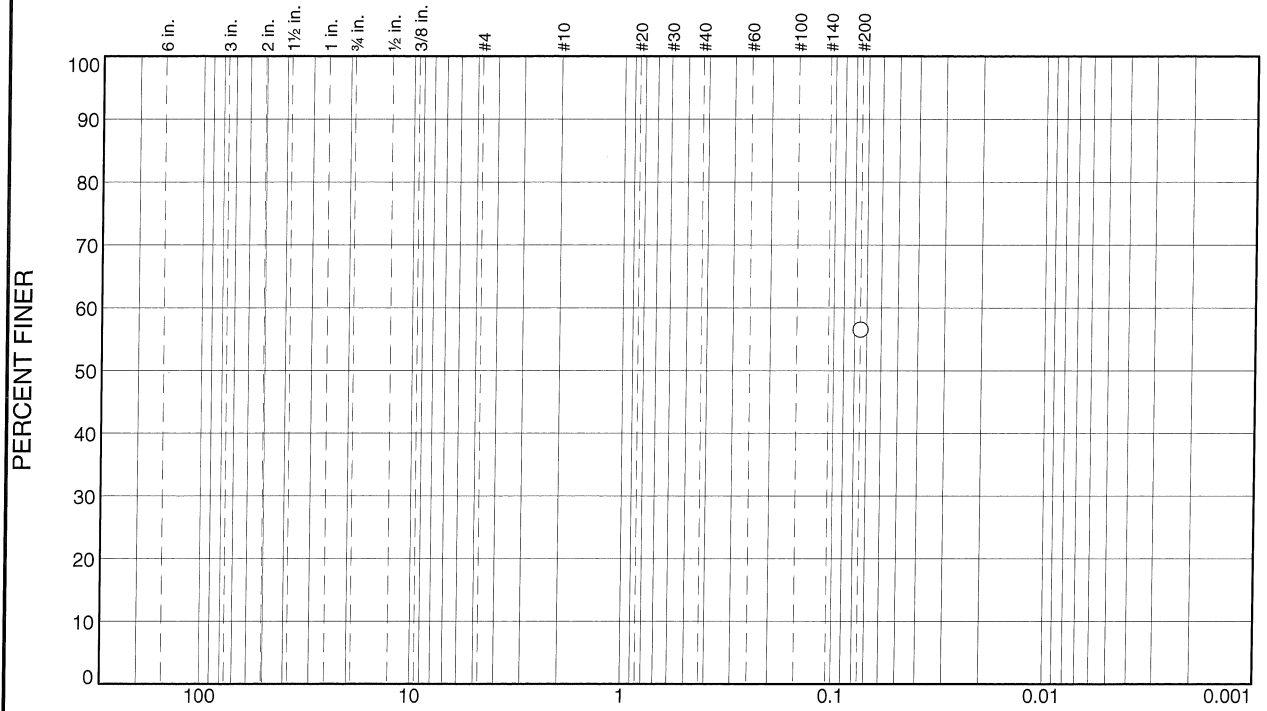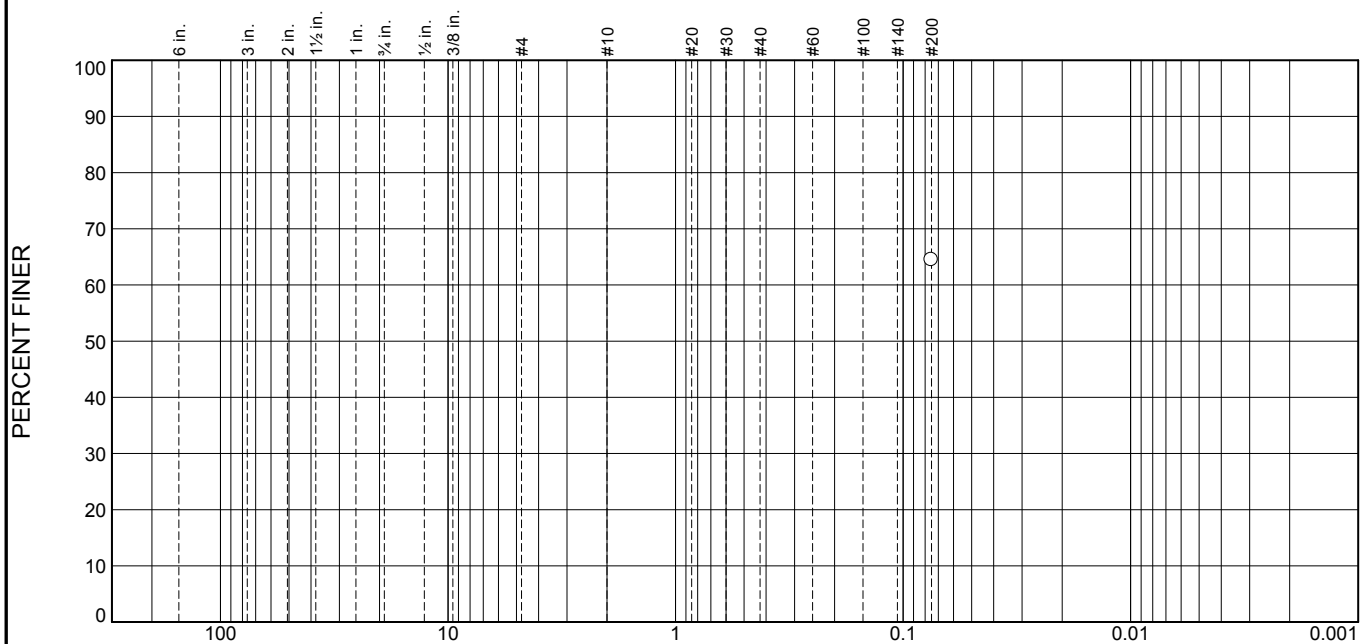## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
　　　Fresno to Bakersfield Geotech Investigation

Project No: 11-111　　　　　　　　Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.6	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	56.6		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: Date Tested: 11/16/11
    Tested By: ky
    Checked By: cw
          Title: PM

* (no specification provided)

Location: S0005R, S15
Sample Number: S36251   **Depth:** 46.5-47.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA
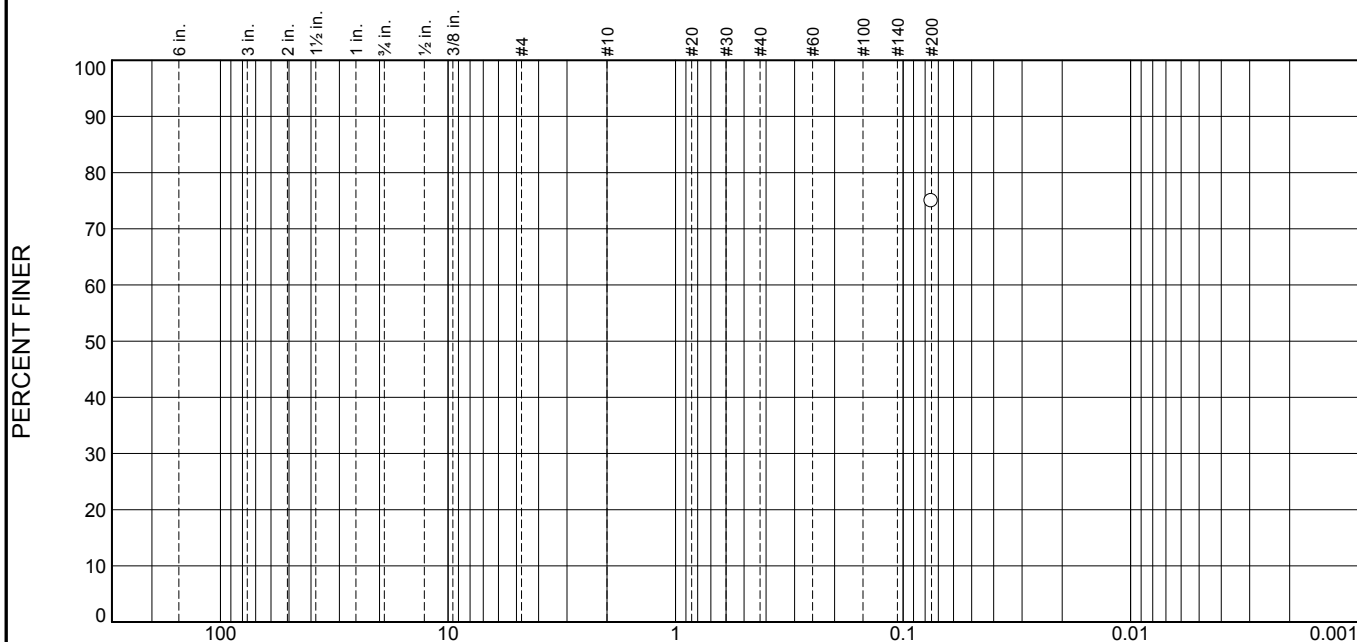
Client: URS / HMM/ ARUP
Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.5	

TEST RESULTS				Material Description

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	64.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 20   LL= 24   PI= 4

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: js
Title: PM

Location: S0005R, S17
Sample Number: S35543   **Depth:** 49.5-51.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA	**Client:** URS / HMM/ ARUP
	Project: CA High Speed Train Fresno to Bakersfield Geotech Investigation
	Project No: 11-111 **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74.9	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	74.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: js
Title: PM

Location: S0005R, S23
Sample Number: S35545   **Depth:** 80-80.5   **Date Sampled:**

SIERRA TESTING LABS, INC.
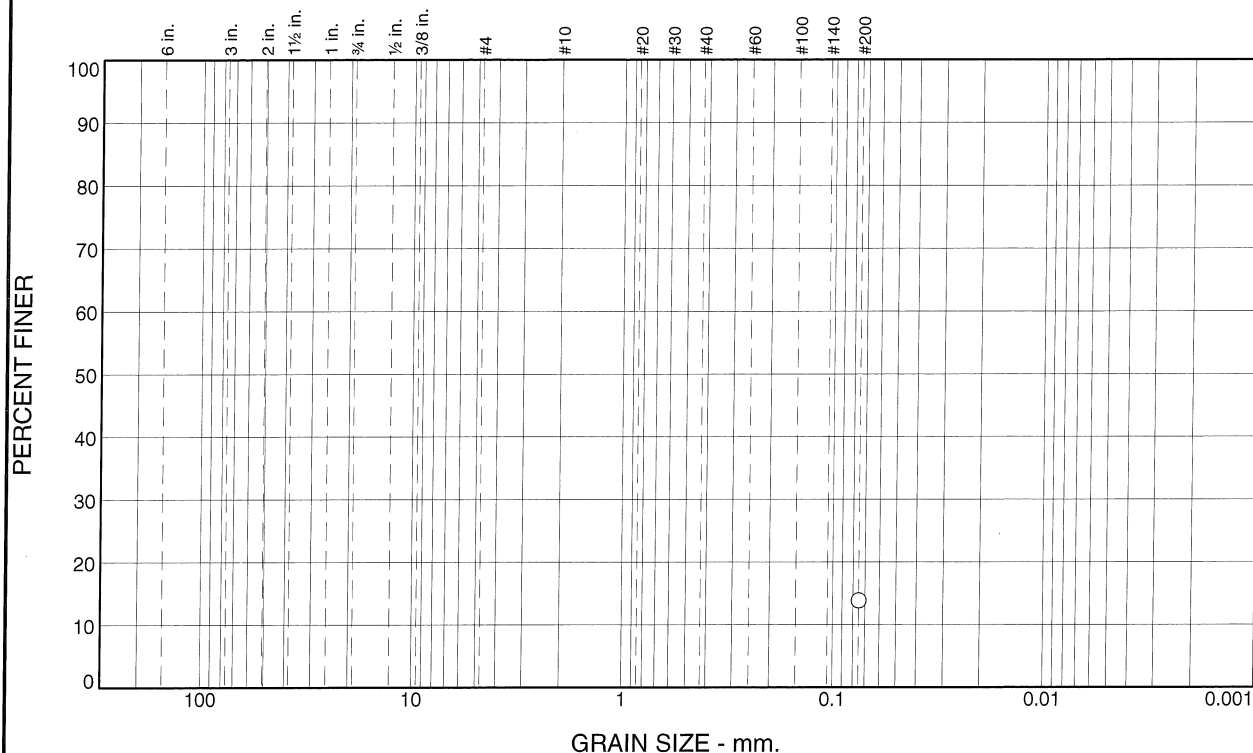## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						13.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	13.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　$D_{85}=$　　　$D_{60}=$
$D_{50}=$　　　$D_{30}=$　　　$D_{15}=$
$D_{10}=$　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/16/11　　　**Date Tested:** 11/16/11

Tested By: ky
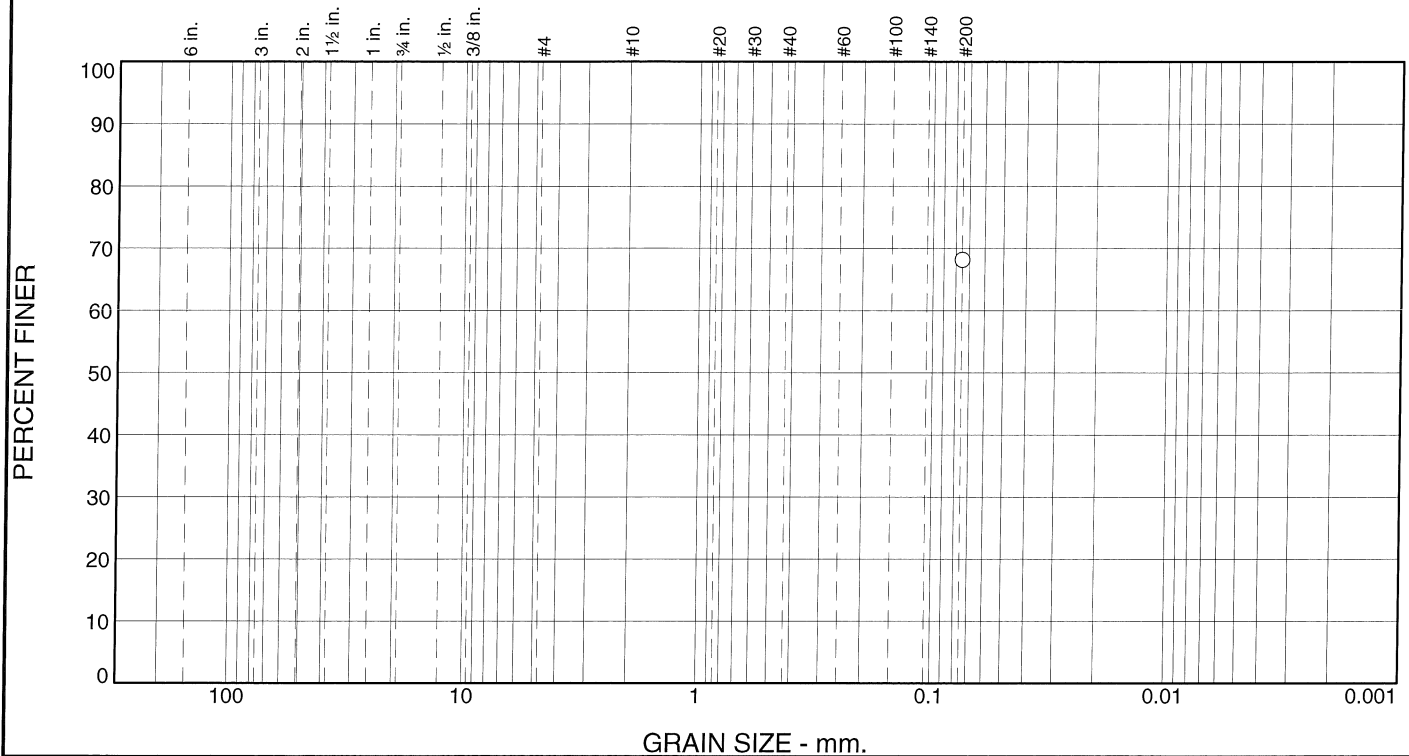
Checked By: cw

Title: PM

Location: S0006R, S06
Sample Number: S36253　　　**Depth:** 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　**Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	68.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ac

Checked By: js

Title: PM

Location: S0006R, S08
Sample Number: S35547   **Depth:** 14-15.2

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
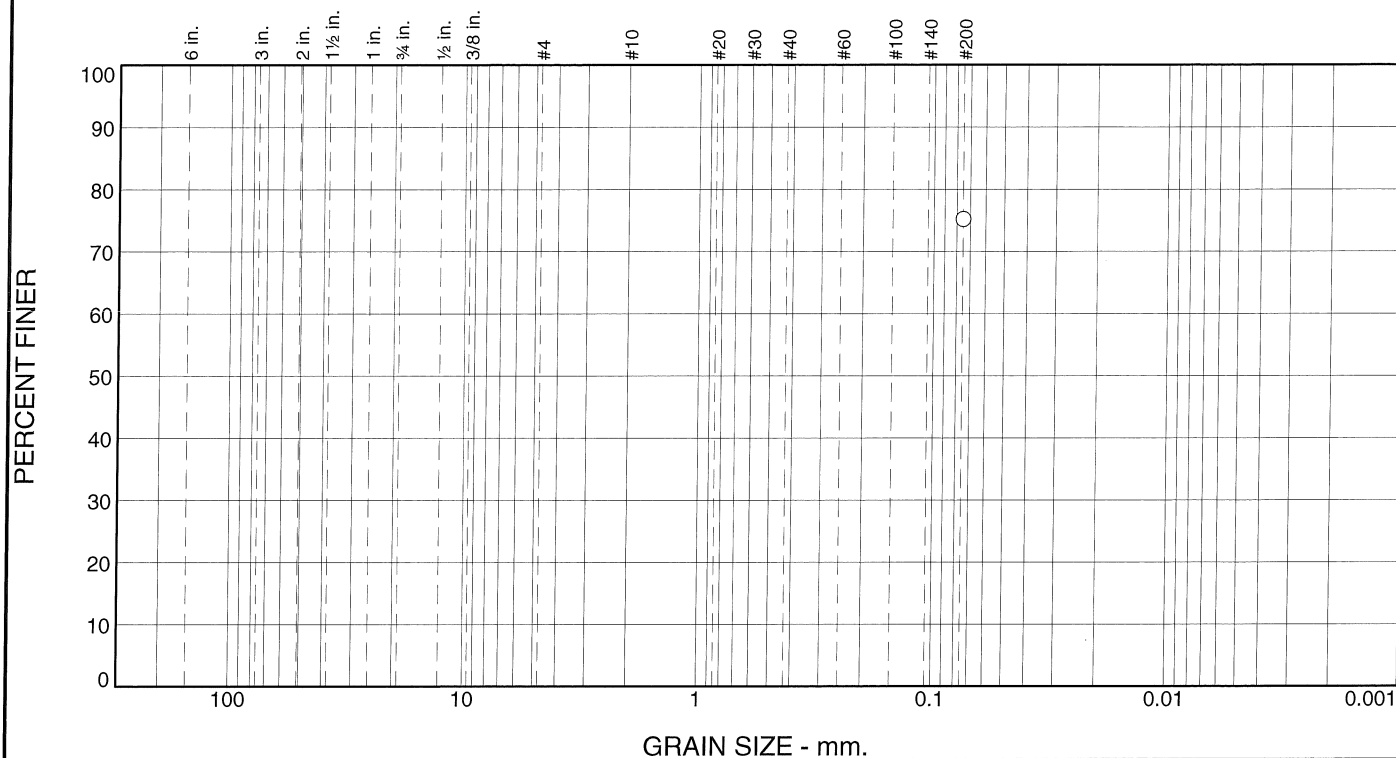
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	75.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: js
Title: PM

Location: S0006R, S09
Sample Number: S35548   Depth: 20-21.3

Date Sampled:

**SIERRA TESTING LABS, INC. El Dorado Hills, CA**
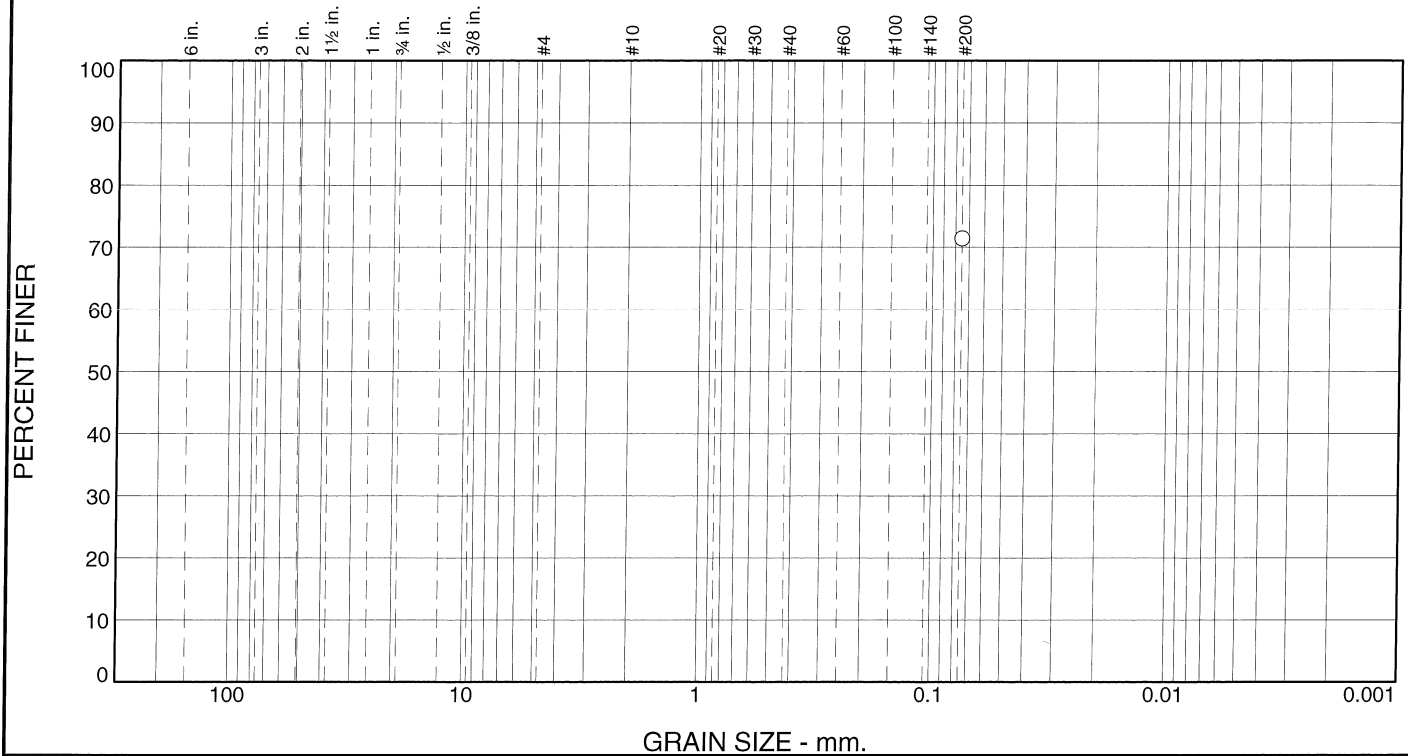
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						71.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	71.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　LL=　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11
Tested By: jm
Checked By: js
Title: PM

* (no specification provided)

Location: S0006R, S13
Sample Number: S35551　　**Depth:** 36.5-38.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
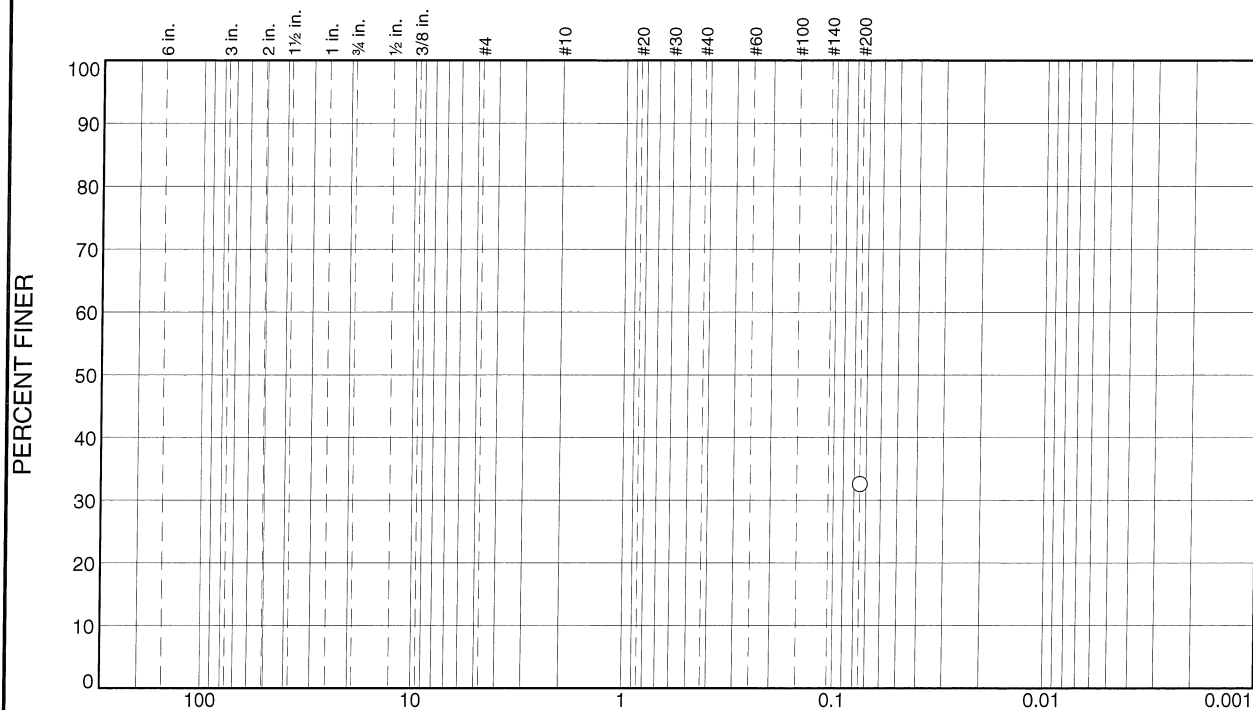
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						32.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	32.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0006R, S14
Sample Number: S36254   Depth: 38-39.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						39.5	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	39.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

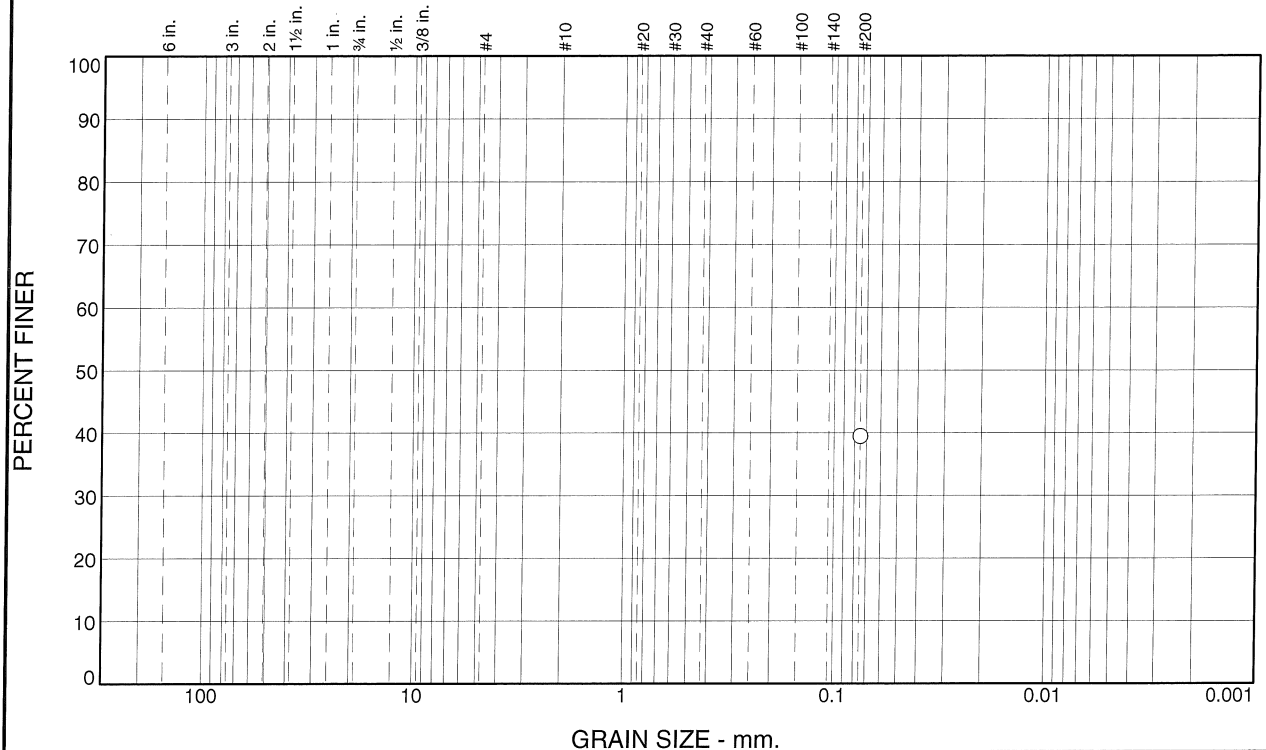Tested By: ky

Checked By: cw

Title: PM

Location: S0006R, S15

Sample Number: S36255   Depth: 39.5-40.8

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.8		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0007R, S01
Sample Number: S36256   Depth: 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						32.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	32.6		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)
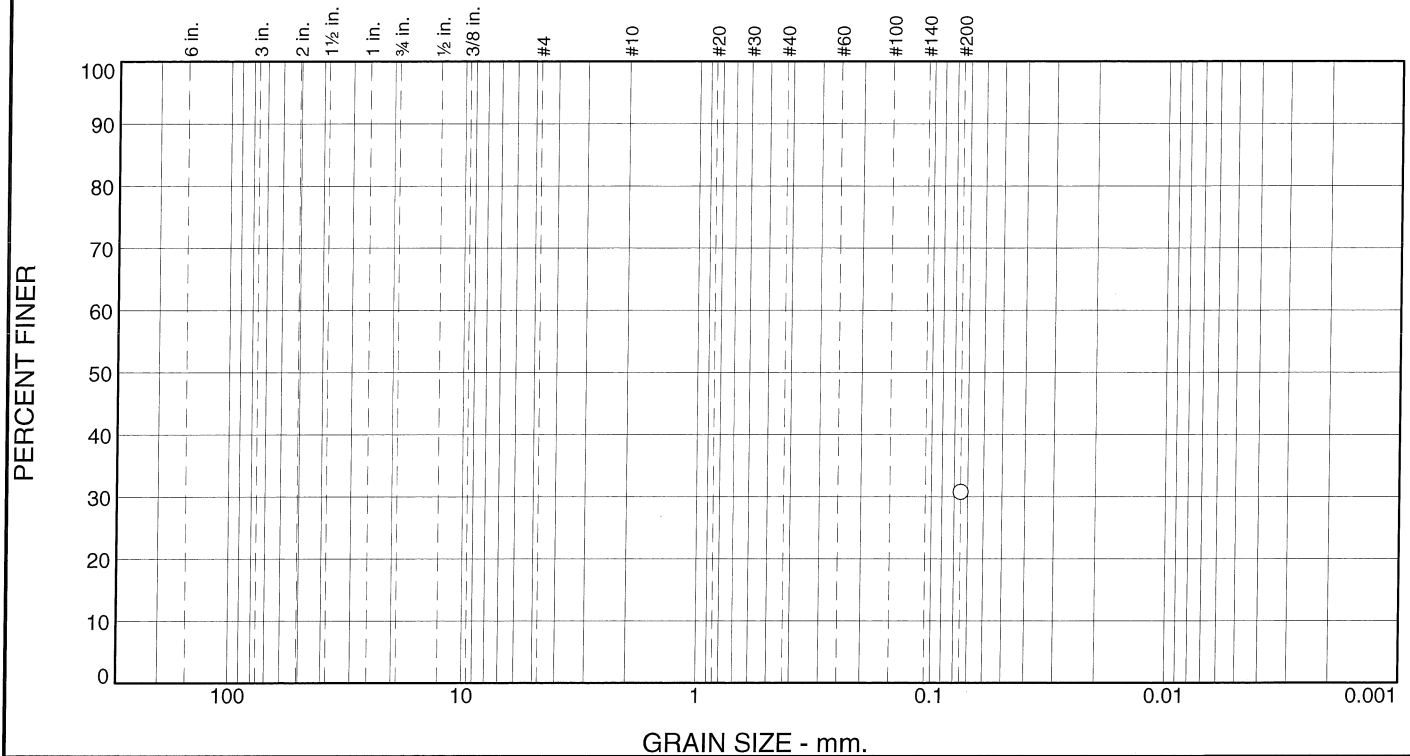
Location: S0007R, S04
Sample Number: S36257   Depth: 5-6.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
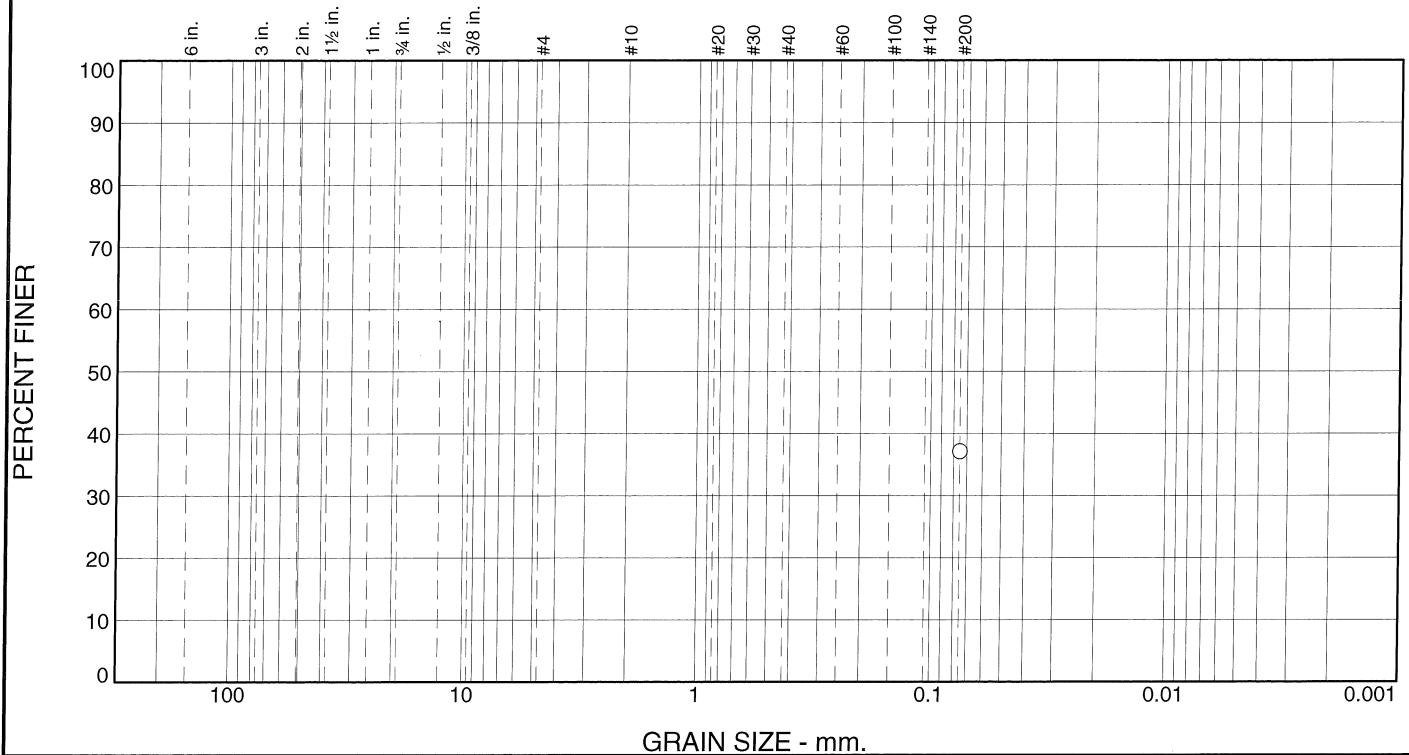
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	37.2		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: jm

Checked By: js

Title: PM

* (no specification provided)

Location: S0007R, S03

Sample Number: S35554   Depth: 6.5-8

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
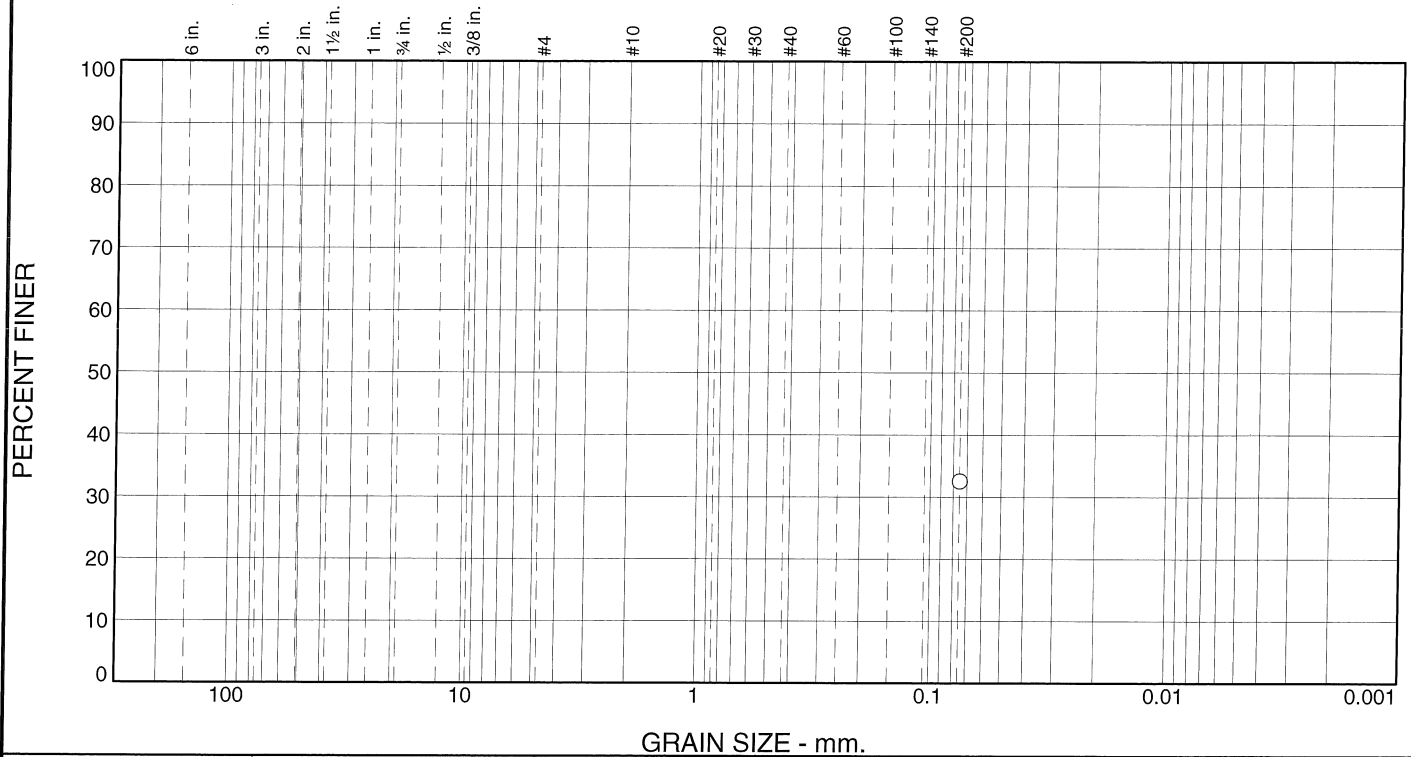
Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
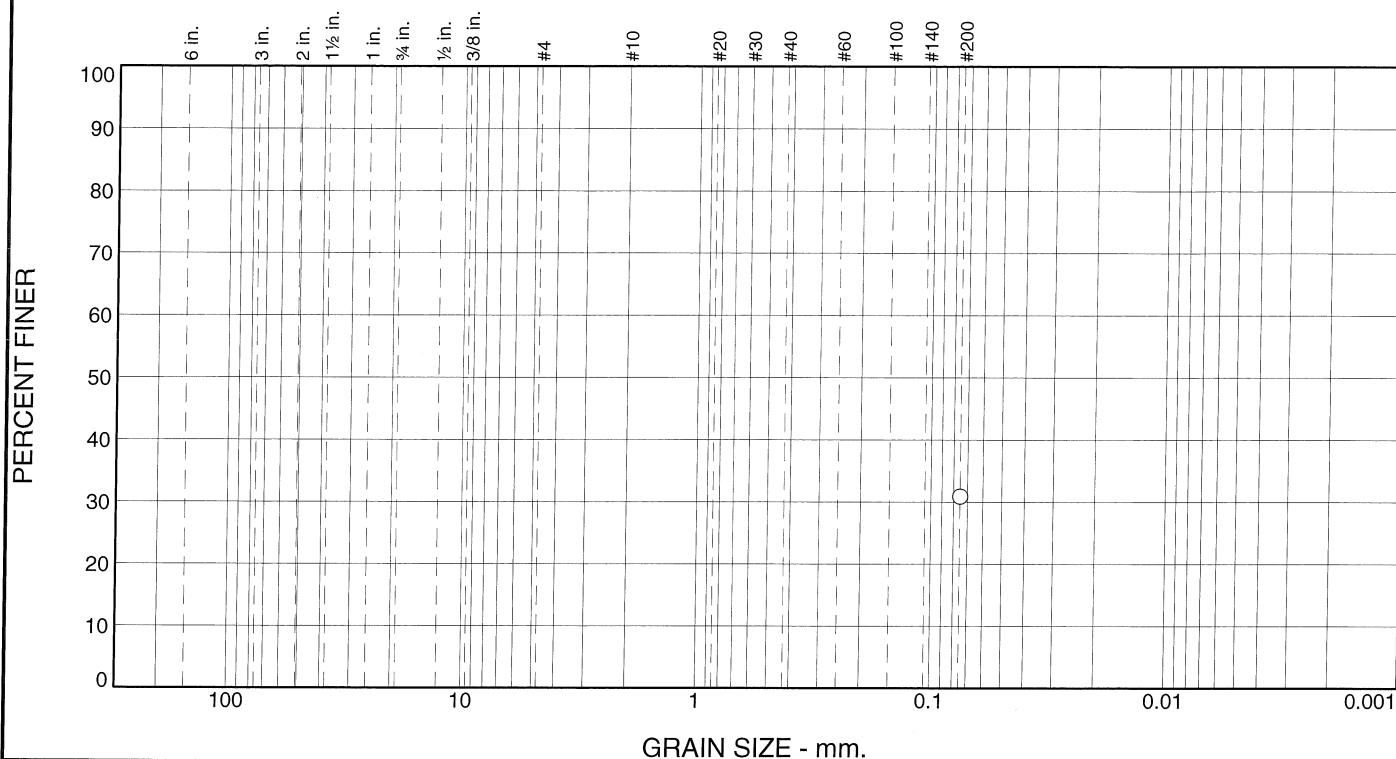
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0007R, S06
Sample Number: S36258   Depth: 9-10.3   Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
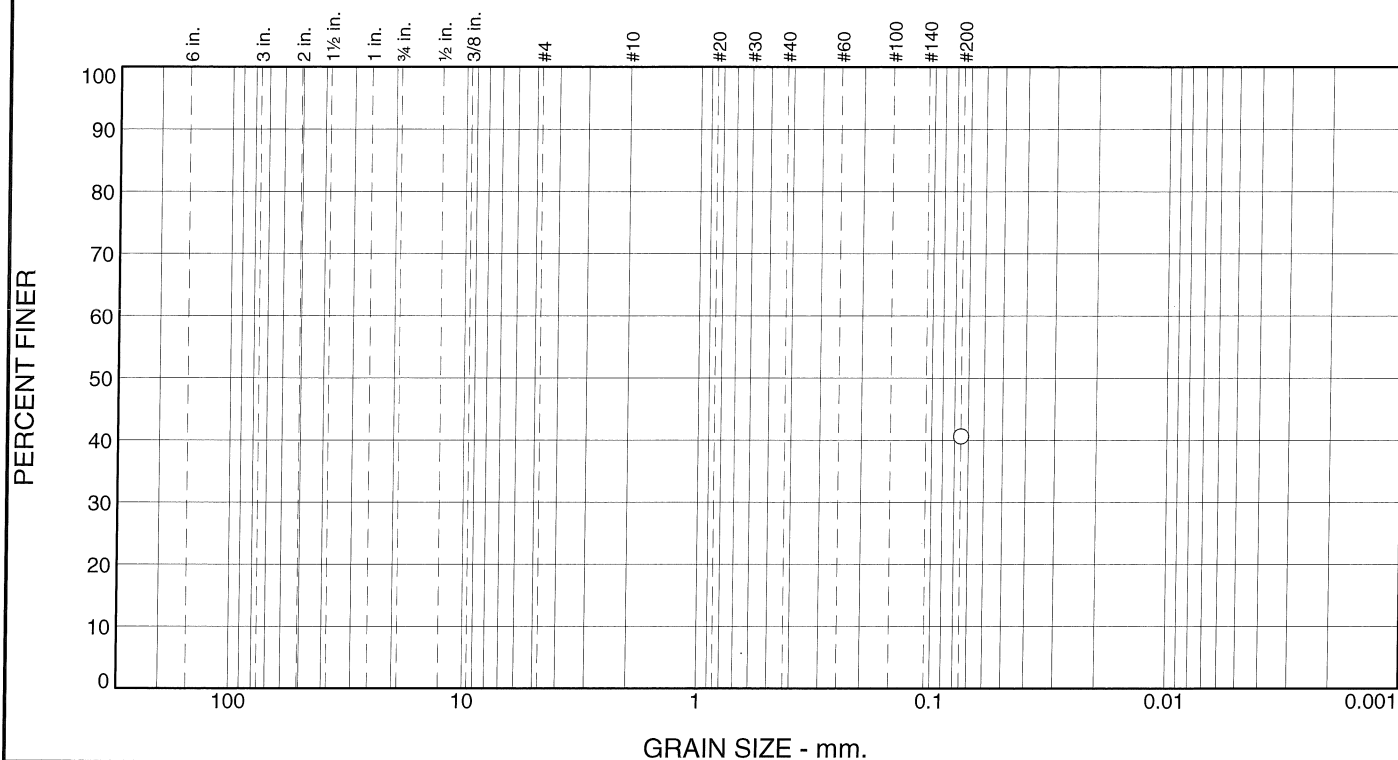
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	40.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: jm

Checked By: js
Title: PM

* (no specification provided)

Location: S0007R, S08
Sample Number: S35555   **Depth:** 14-15.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
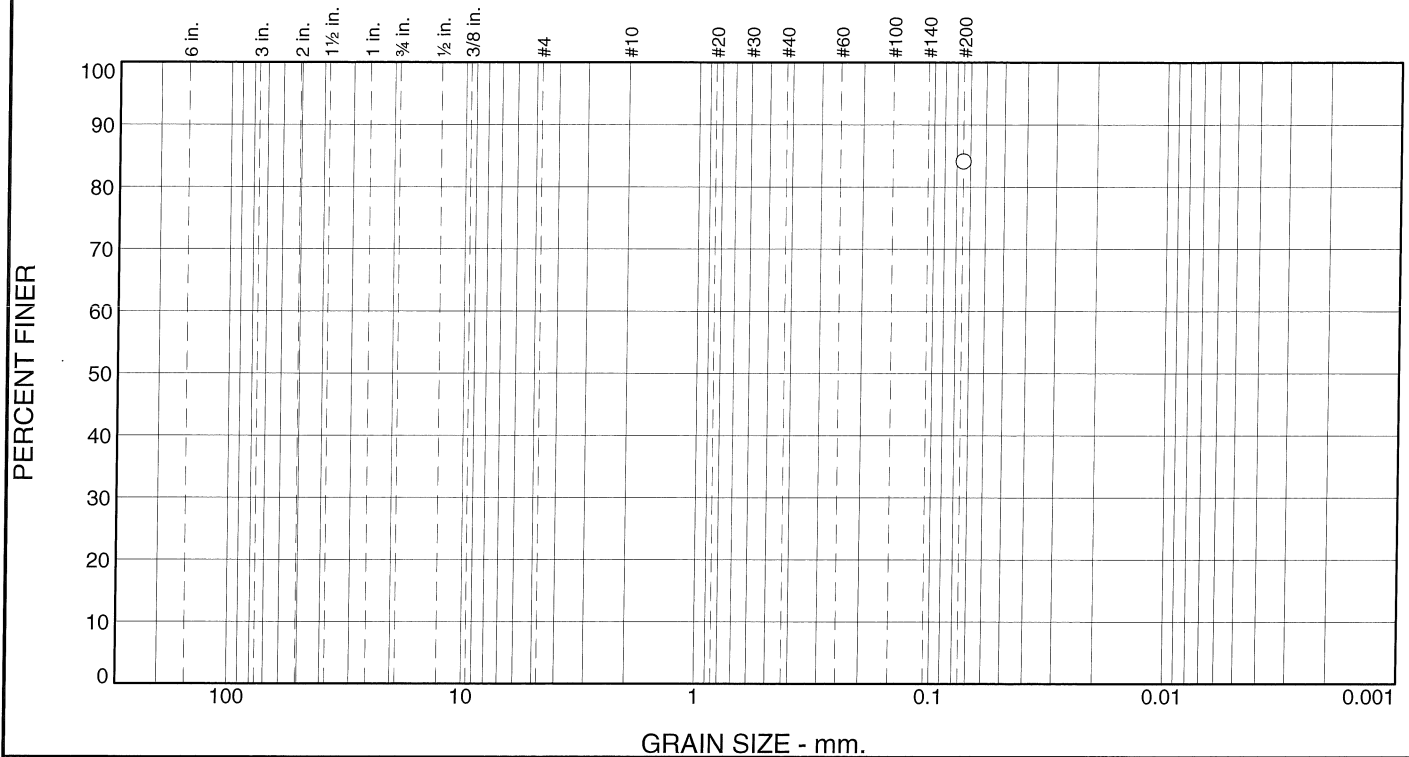
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						84.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	84.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0007R, S11A
Sample Number: S35557   **Depth:** 30-30.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
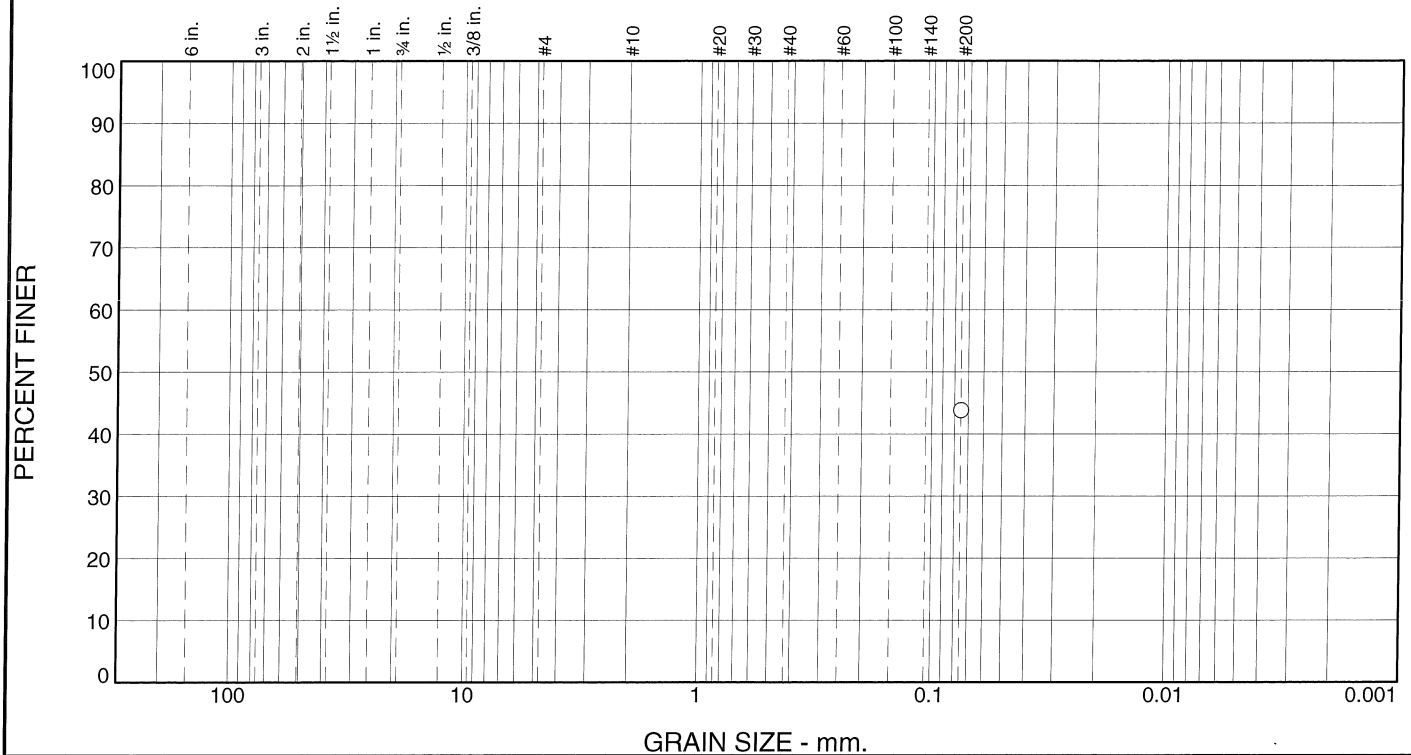
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						43.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	43.9		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0007R, S11B
Sample Number: S35558   Depth: 30.5-31.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
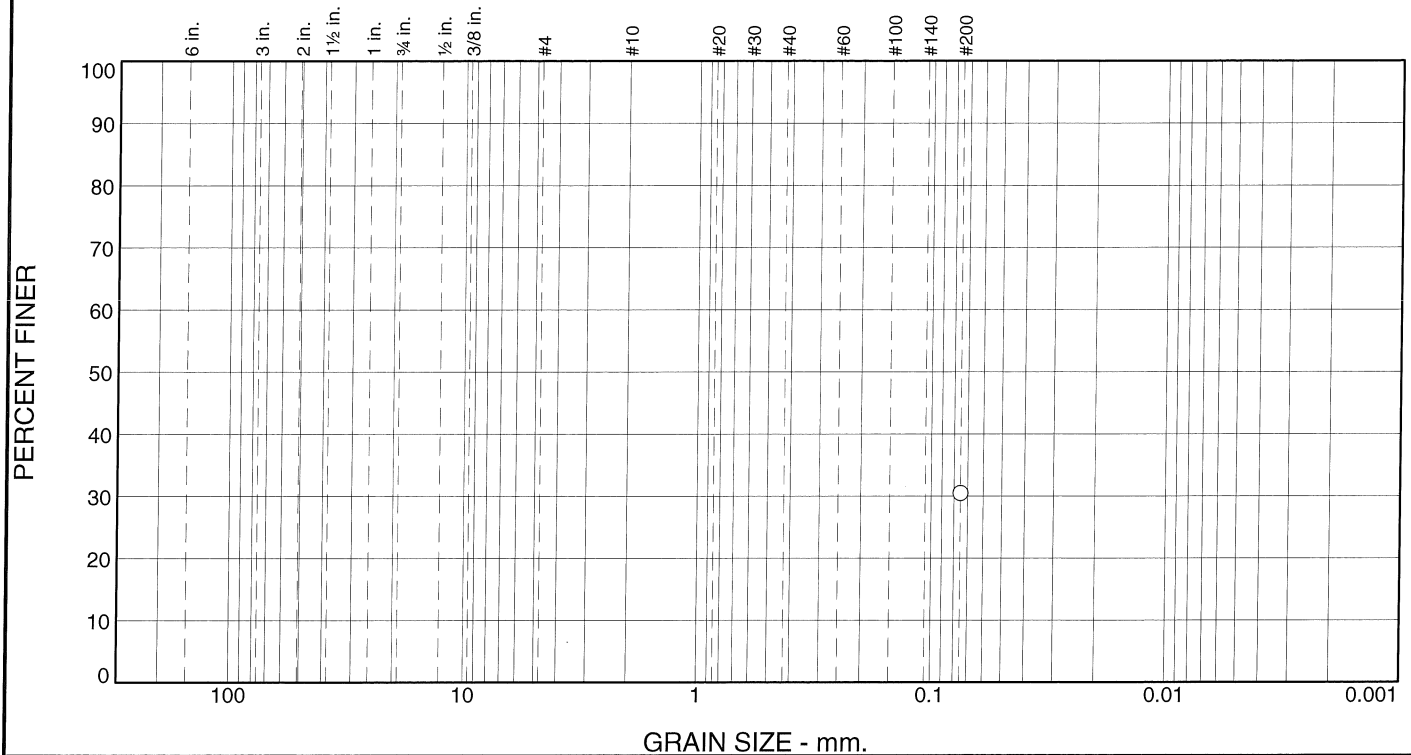
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: jm
Checked By: js
Title: PM

* (no specification provided)

Location: S0007R, S12
Sample Number: S35559   Depth: 35-36.2   Date Sampled:

|	
SIERRA TESTING LABS, INC. El Dorado Hills, CA	Client: URS / HMM/ ARUP Project: CA High Speed Train Fresno to Bakersfield Geotech Investigation Project No: 11-111 Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	68.2		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: jm

Checked By: js

Title: PM

* (no specification provided)

Location: S0007R, S14

Sample Number: S35561   Depth: 45-46.3

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
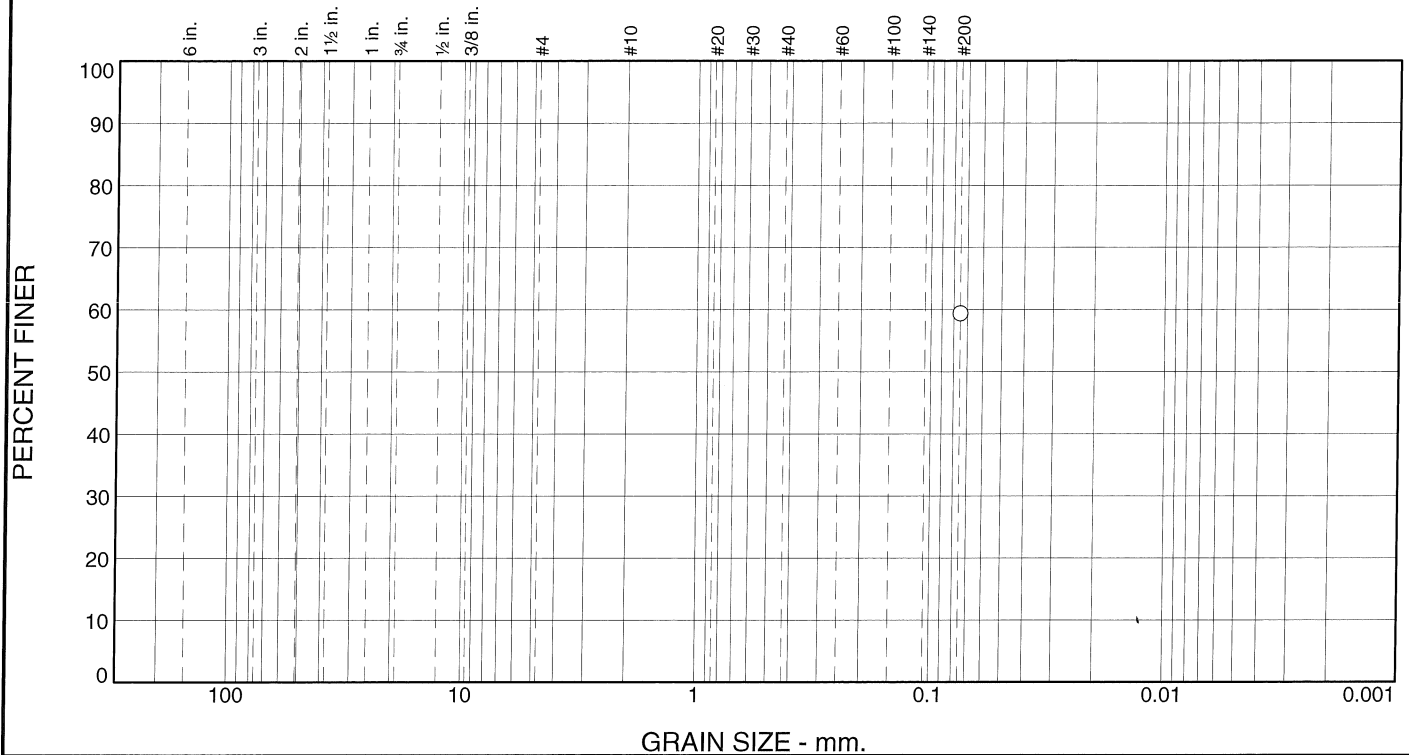
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: jm

Checked By: js

Title: PM

* (no specification provided)

Location: S0007R, S16B

Sample Number: S35563   Depth: 55.8-56.5

Date Sampled:

## SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
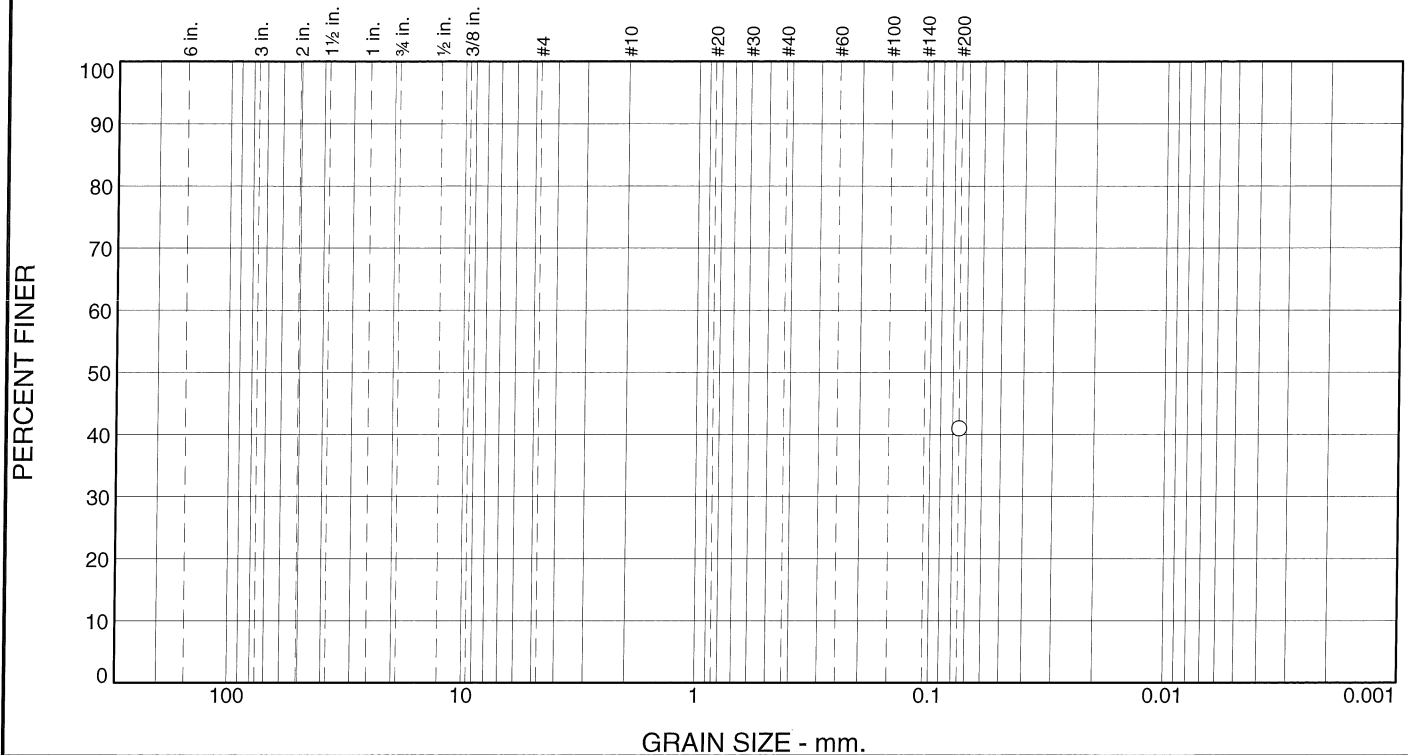
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						41.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	41.0		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: jm
Checked By: js
Title: PM

* (no specification provided)

Location: S0007R, S17
Sample Number: S35564   **Depth:** 60-61.5   **Date Sampled:**

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes marked: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.1	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	50.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: jm
Checked By: js
Title: PM

Location: S0007R, S18
Sample Number: S35565   Depth: 65-66.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

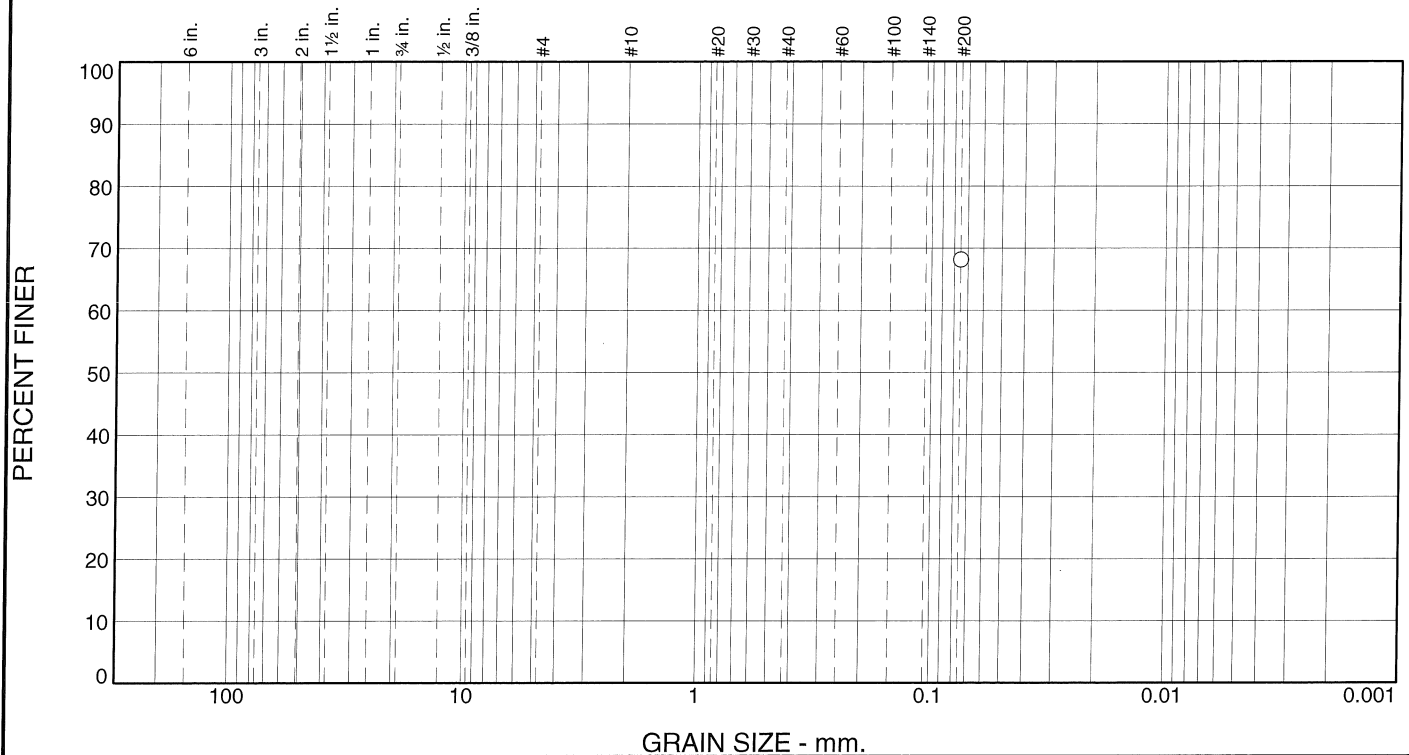Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
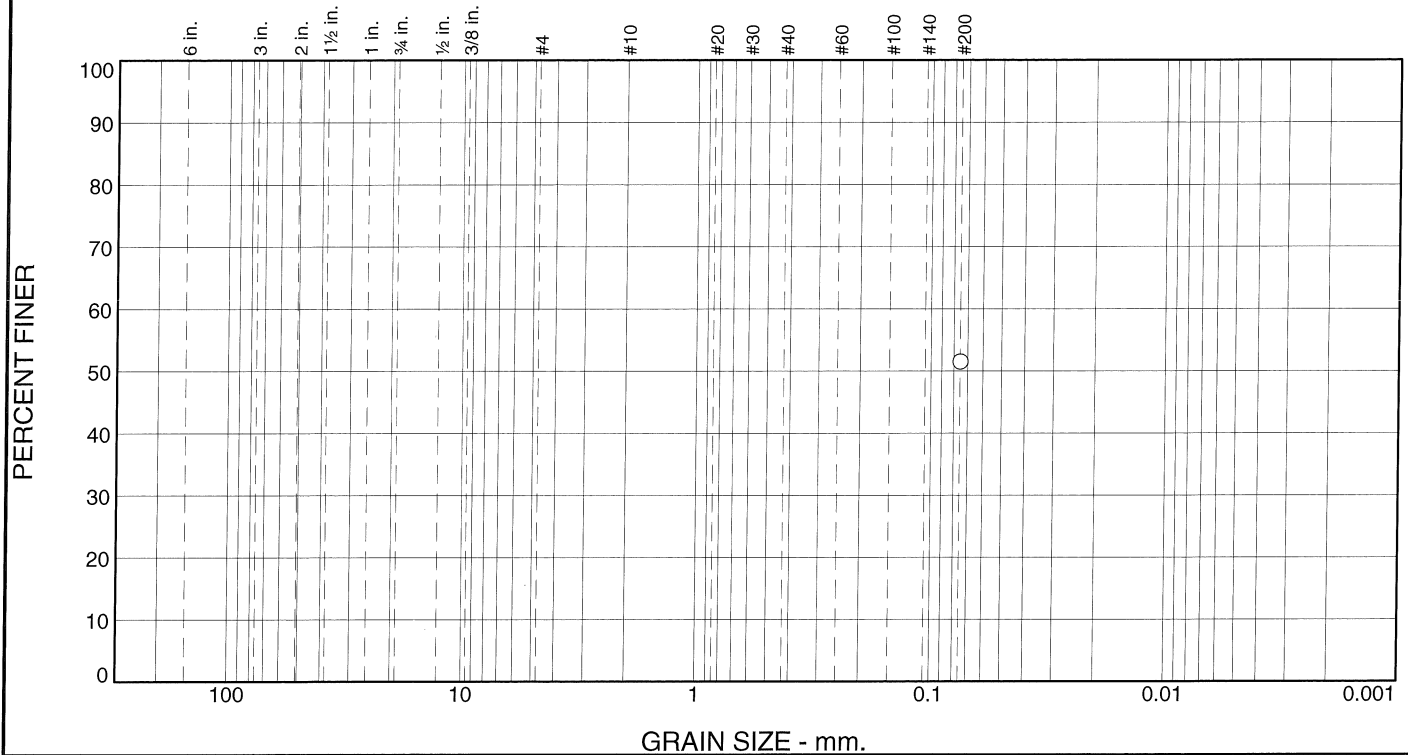
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	51.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: jm

Checked By: js

Title: PM

* (no specification provided)

Location: S0007R, S20

Sample Number: S35566   **Depth:** 75-76.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						22.3	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	22.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac

Checked By: cw

Title: PM

Location: S0010R, S01
Sample Number: S36260   **Depth:** 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

**Client:** URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

			PERCENT FINER	

Grain size chart with sieve sizes labeled across the top: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

Y-axis: PERCENT FINER (0 to 100)
X-axis: GRAIN SIZE - mm. (100, 10, 1, 0.1, 0.01, 0.001)

A single data point plotted at approximately grain size 0.075 mm, percent finer 24.4.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						24.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	24.4		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0010R, S02
Sample Number: S36261   **Depth:** 5-6.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

| | 6 in. | 3 in. | 2 in. | 1½ in. | 1 in. | ¾ in. | ½ in. | 3/8 in. | #4 | #10 | #20 | #30 | #40 | #60 | #100 | #140 | #200 |

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						57.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	57.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   **LL=**   **PI=**

Classification

USCS (D 2487)=   **AASHTO (M 145)=**

Coefficients

D_{90}=   **D_{85}=**   **D_{60}=**
D_{50}=   **D_{30}=**   **D_{15}=**
D_{10}=   **C_u=**   **C_c=**

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0010R, S04
Sample Number: S36262   **Depth:** 8-9.4

Date Sampled:

SIERRA TESTING LABS, INC.
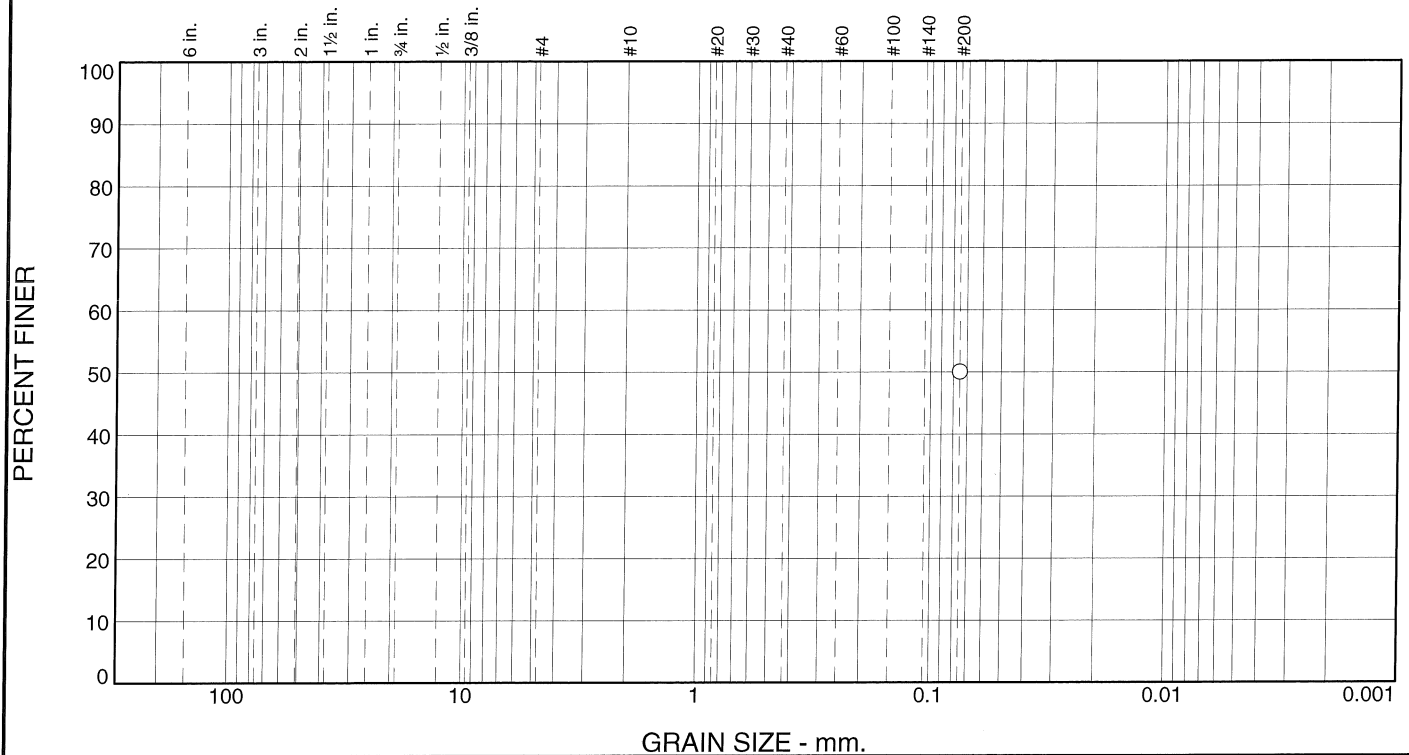## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	52.9		

Material Description

Atterberg Limits (ASTM D 4318)

PL= 22   LL= 27   PI= 5

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0010R, S05
Sample Number: S35568   Depth: 9.5-10.9

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						41.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	41.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

* (no specification provided)

Location: S0010R, S06
Sample Number: S35569   Depth: 11-12.4

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
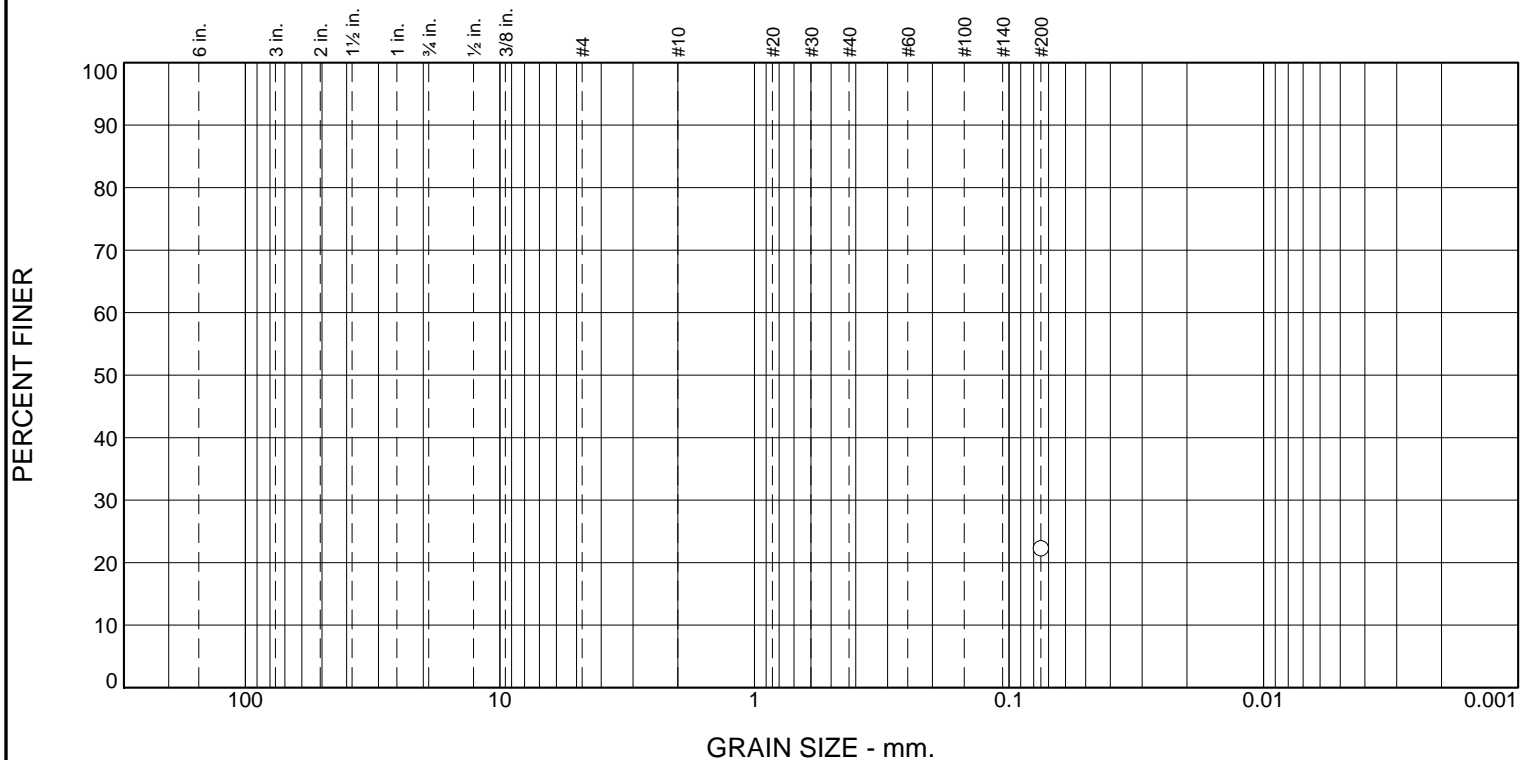Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.9		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 22   LL= 29   PI= 7

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0010R, S07

Sample Number: S35570   Depth: 12.5-13.2

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes across top: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						36.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	36.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0010R, S09
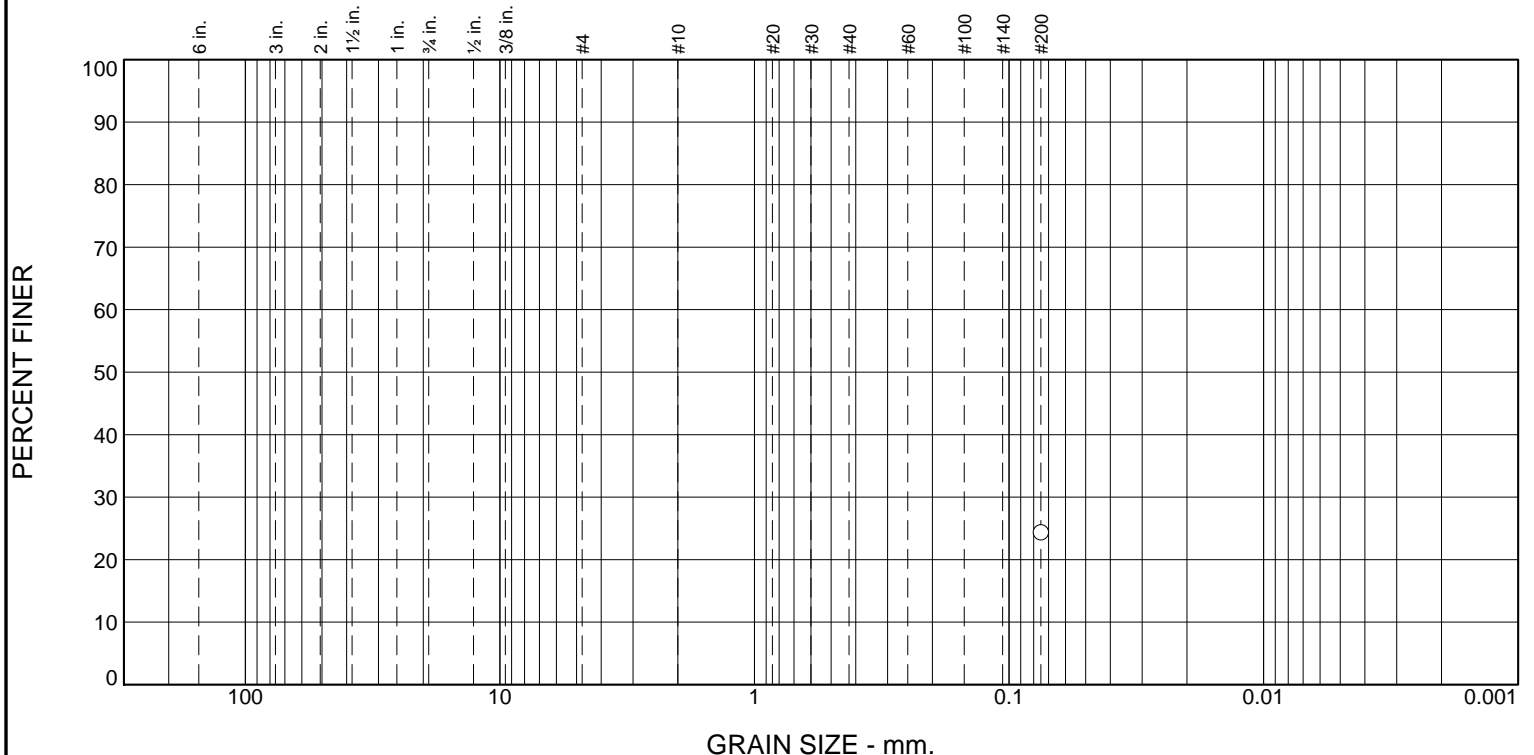**Sample Number:** S36263   **Depth:** 20-21.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER (y-axis, 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						23.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	23.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/16/11　　　**Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0010R, S11
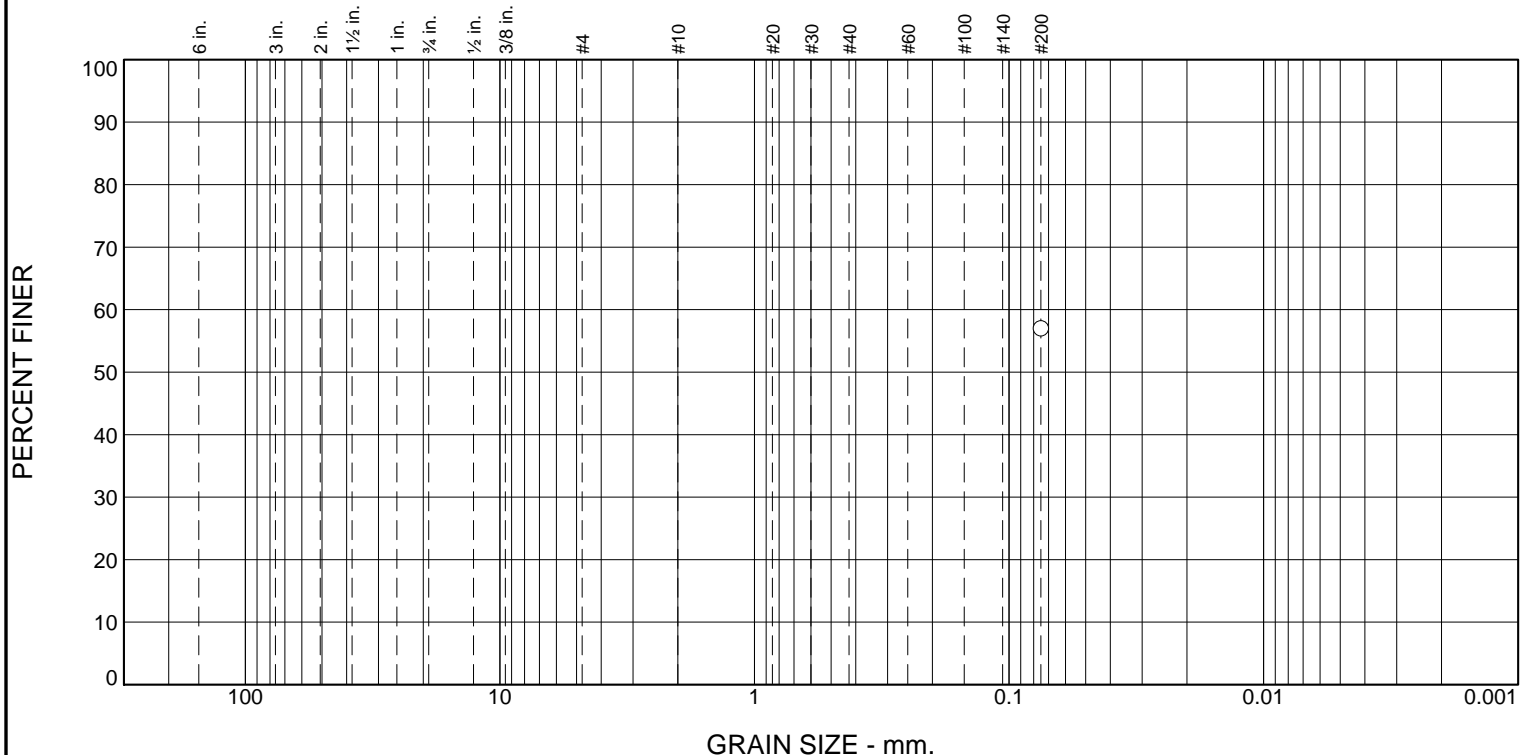**Sample Number:** S36264　　　**Depth:** 30-31.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　**Figure**

Particle Size Distribution Report
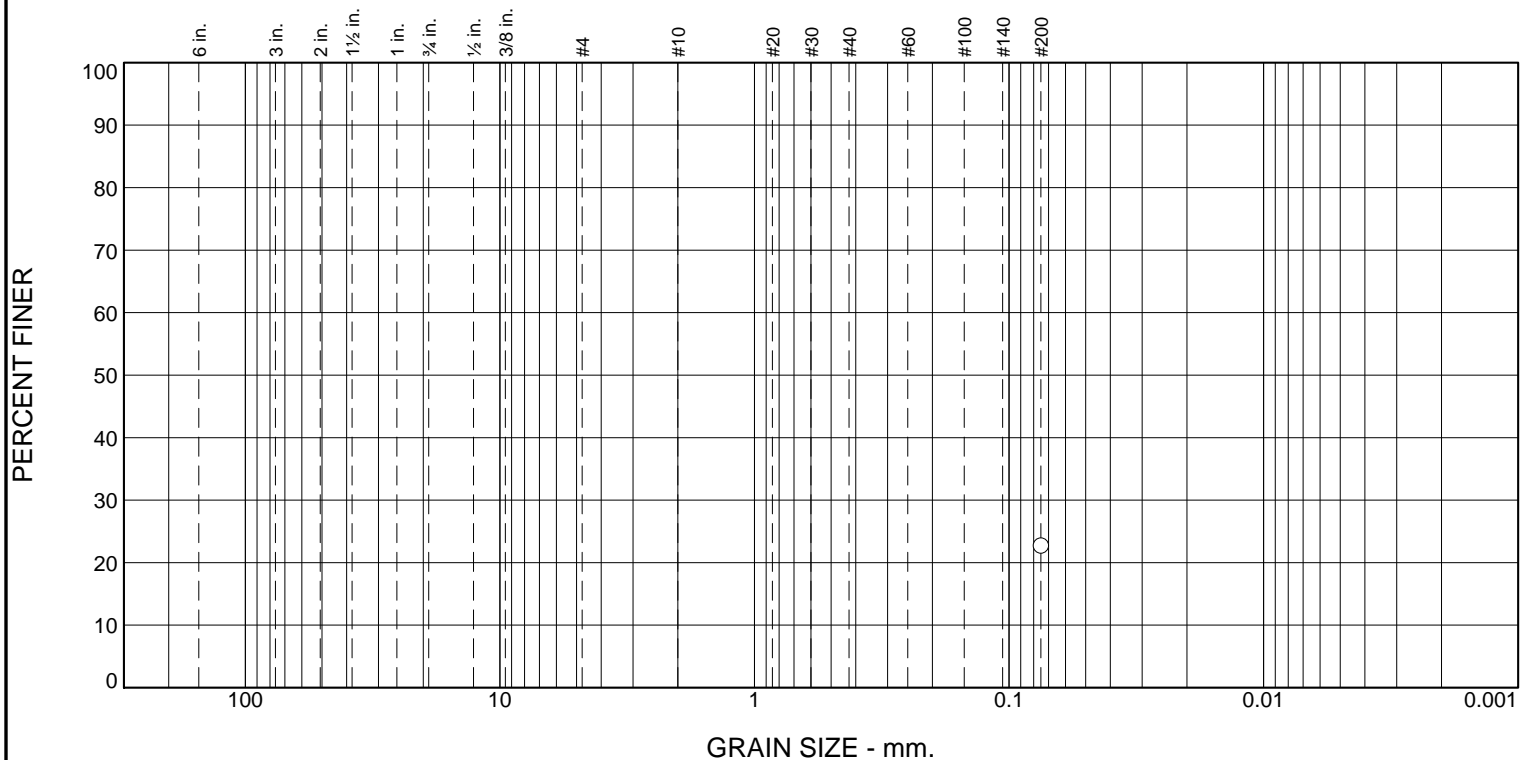
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						22.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	22.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0010R, S12
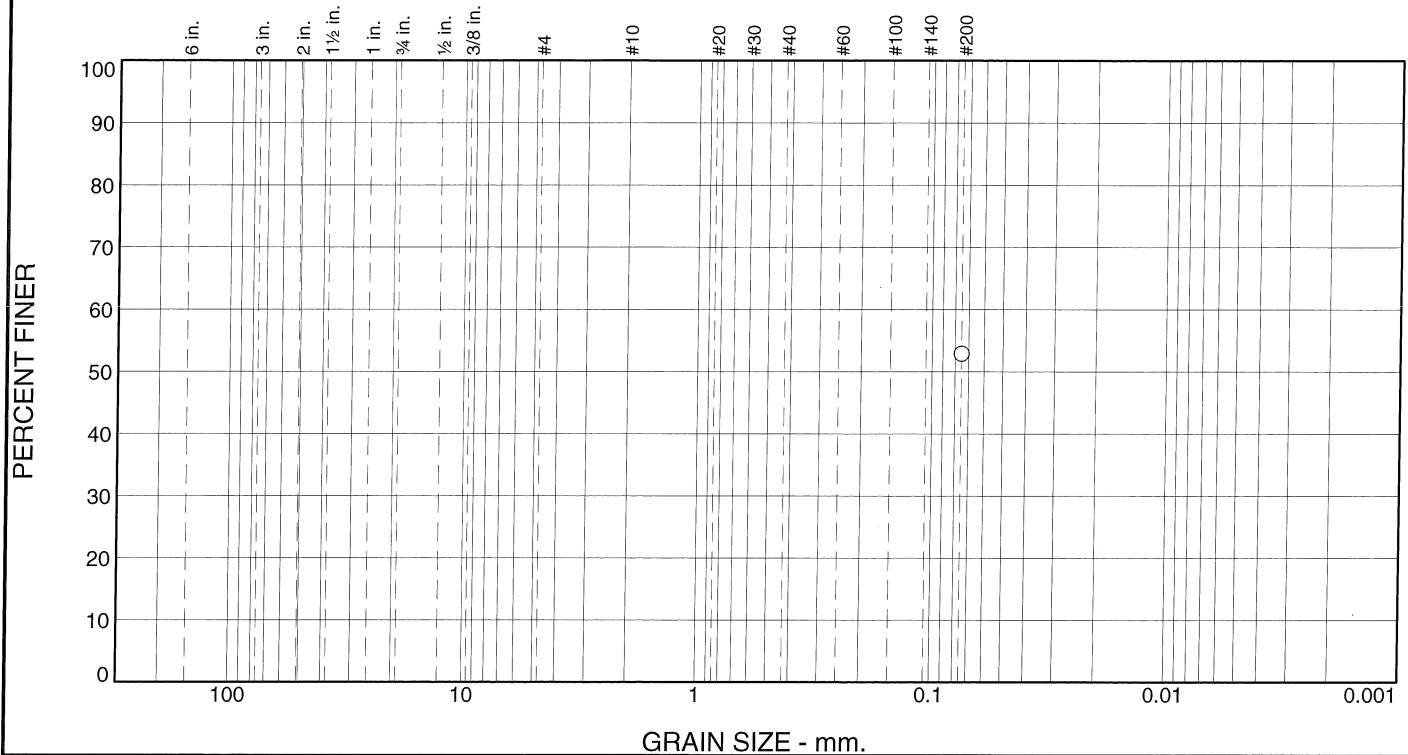**Sample Number:** S36265   **Depth:** 35-36.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	50.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 14   LL= 24   PI= 10

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0010R, S14
Sample Number: S35573   Depth: 45-46.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

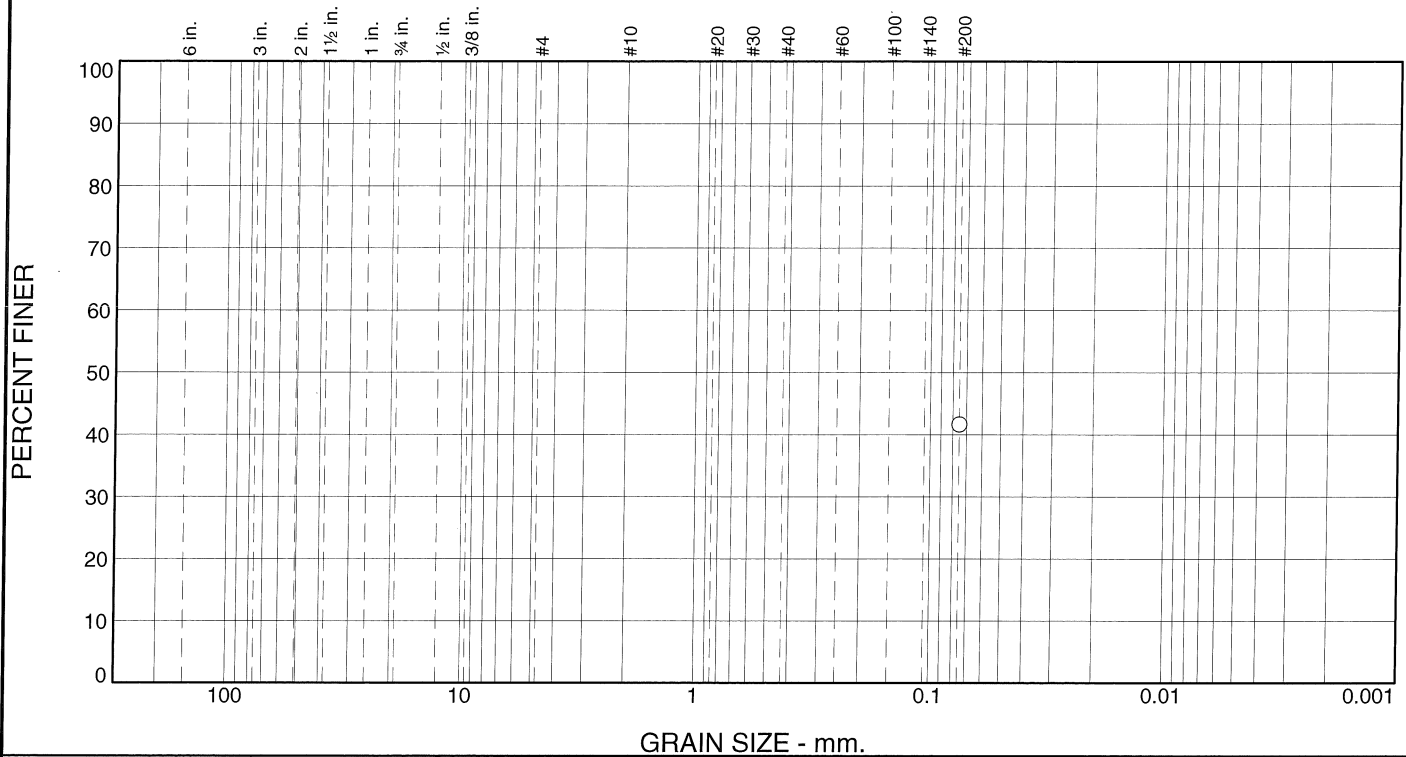Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	75.1		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 21   LL= 30   PI= 9

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0010R, S15
Sample Number: S35574   Depth: 50-51.3

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
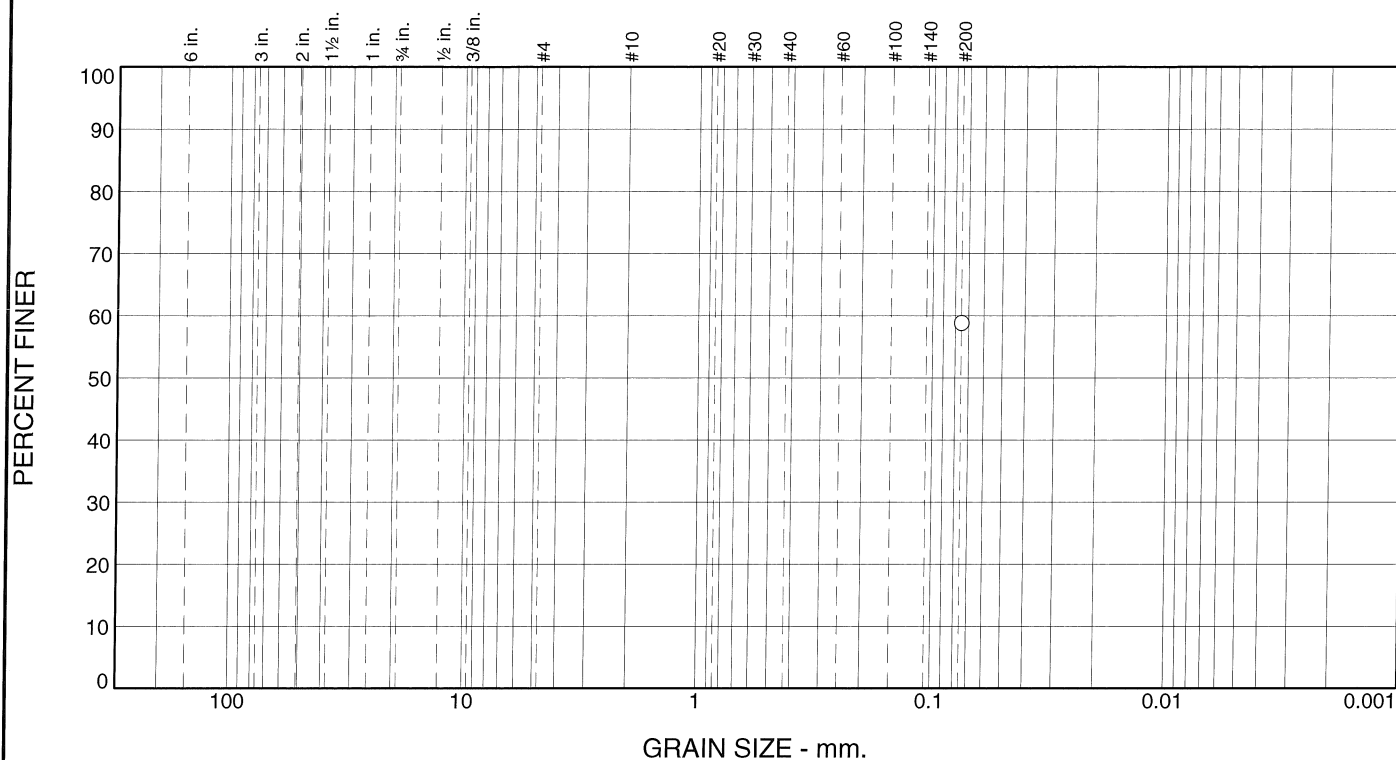
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	64.5		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 17   LL= 25   PI= 8

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky

Checked By: js

Title: PM

Location: S0010R, S17
Sample Number: S35576   Depth: 60-61.3

Date Sampled:

SIERRA TESTING LABS, INC.
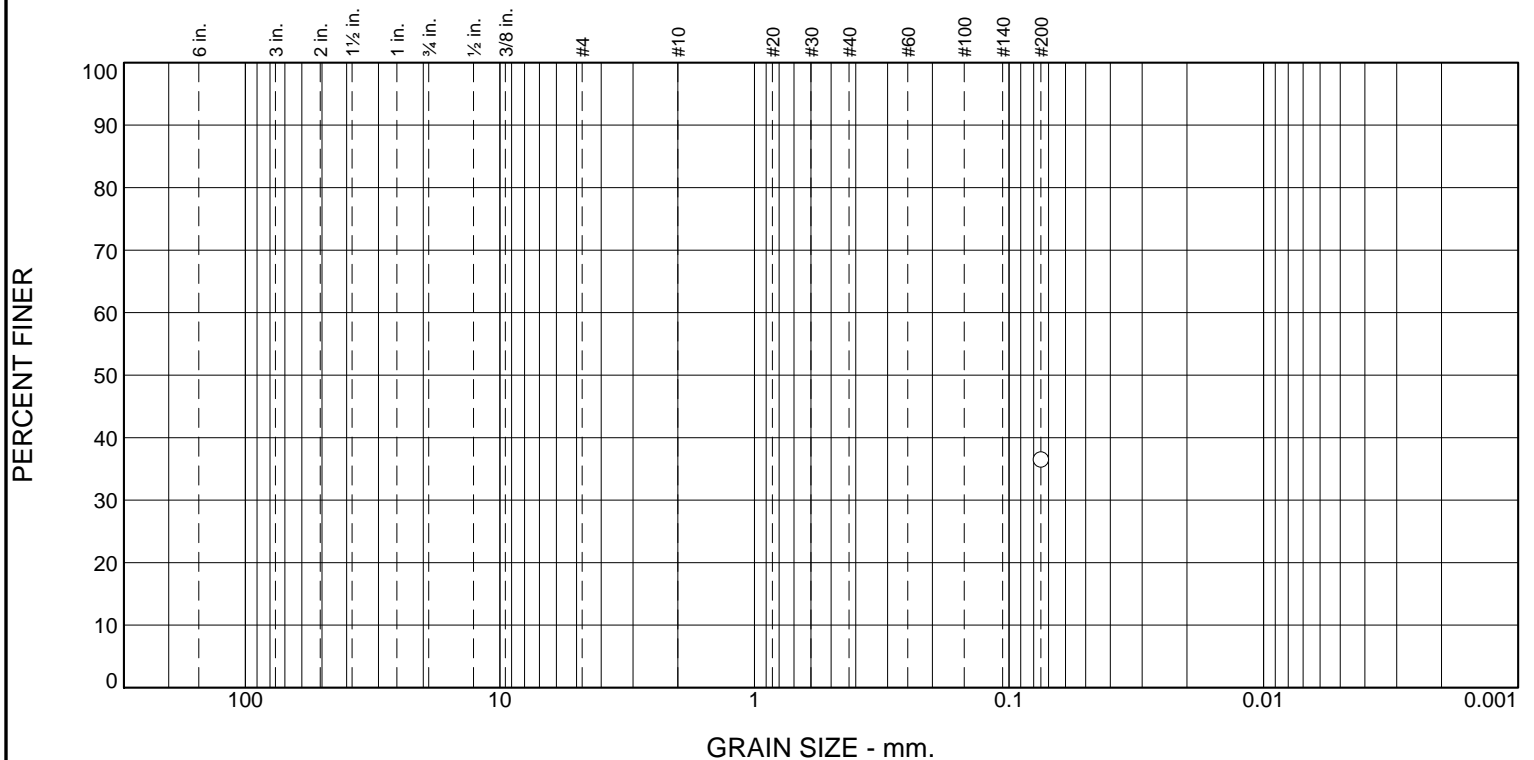## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
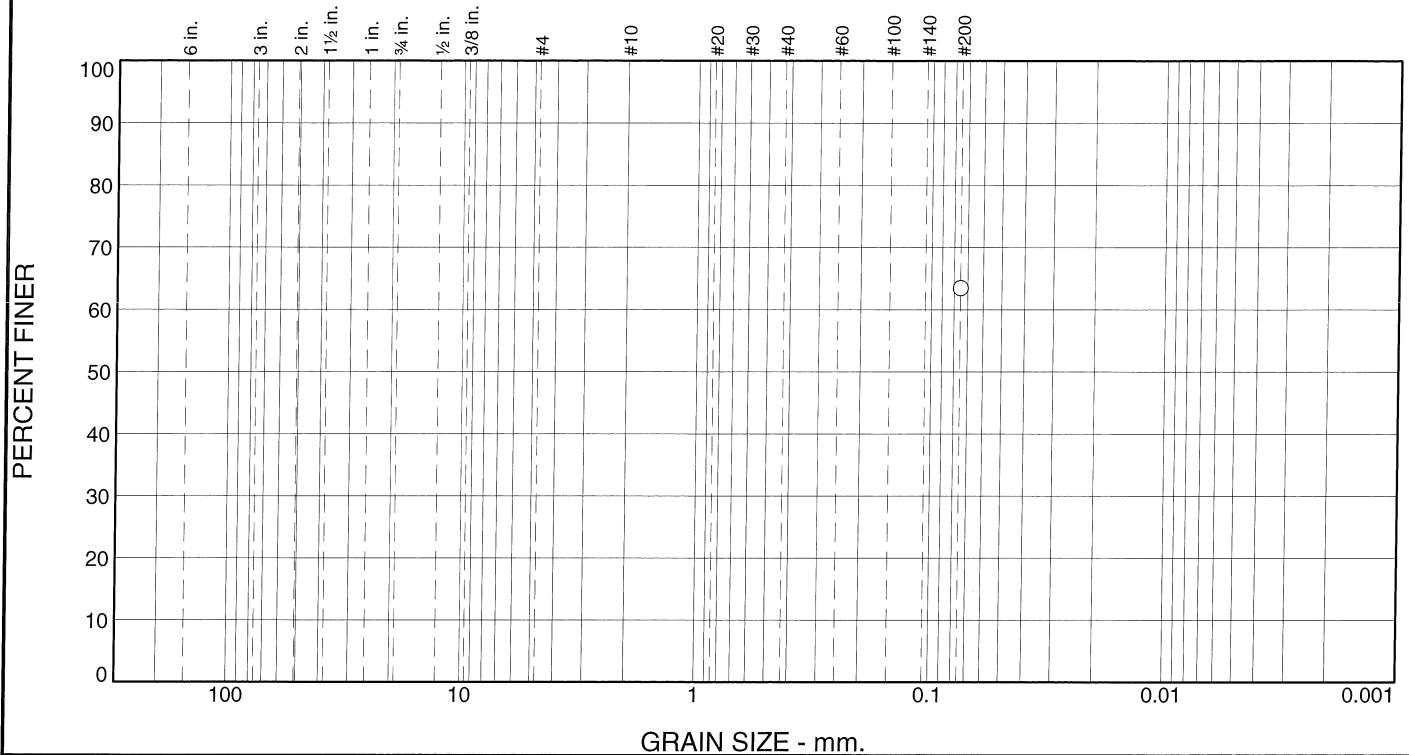
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	63.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 17   LL= 43   PI= 26

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ky
Checked By: js
Title: PM

* (no specification provided)

Location: S0010R, S18
Sample Number: S35577   **Depth:** 65-66.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
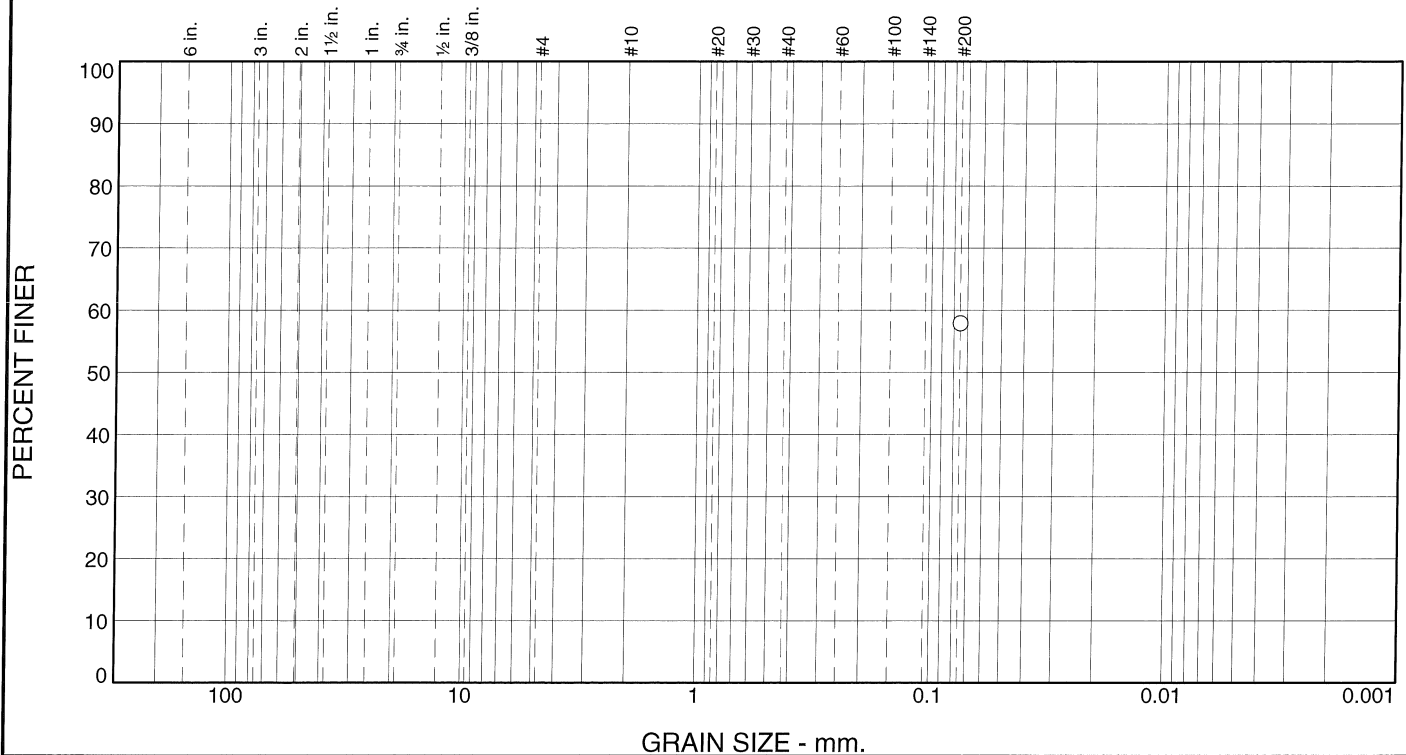
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 23   LL= 25   PI= 2

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0010R, S21
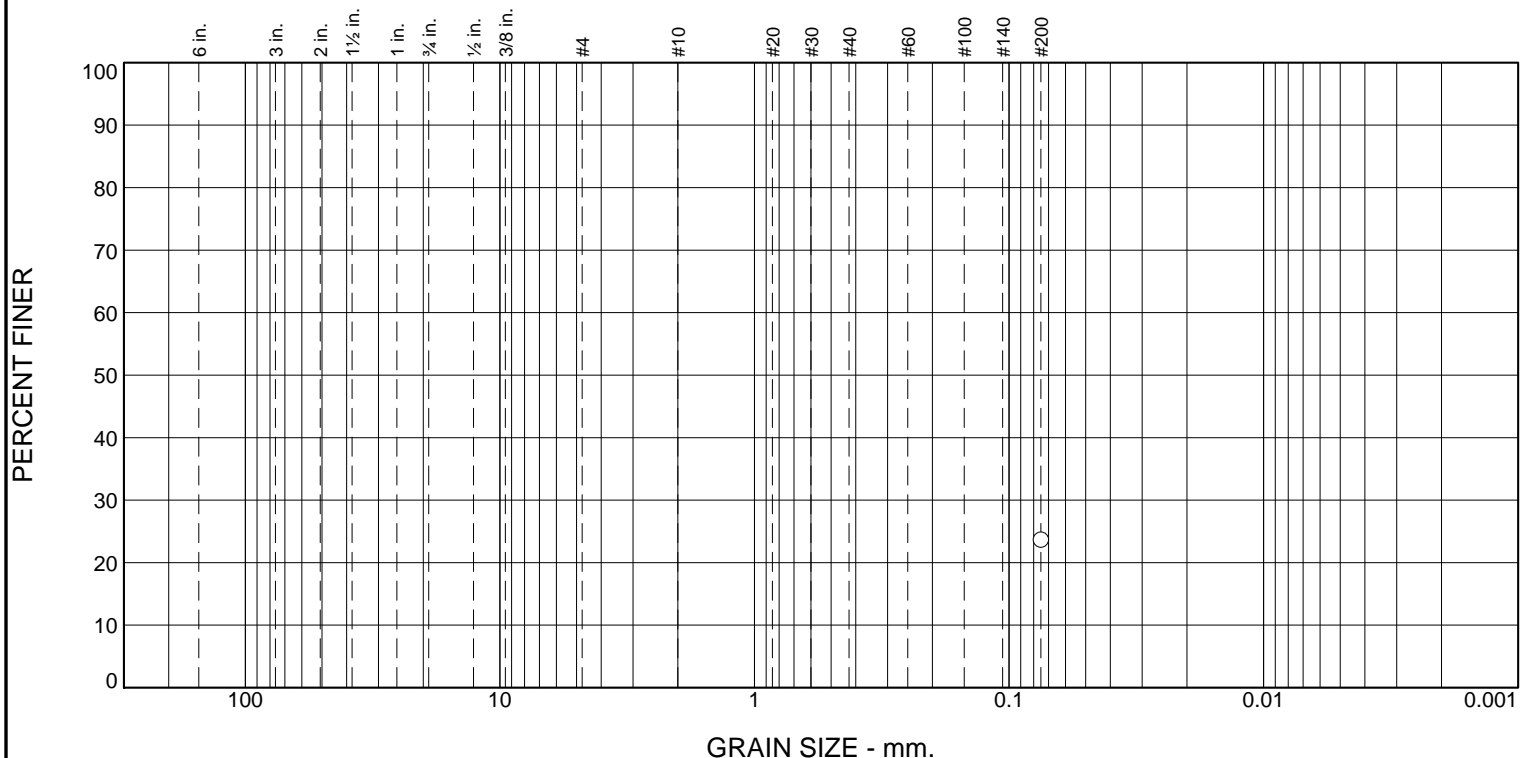Sample Number: S35578   Depth: 80-81.5   Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
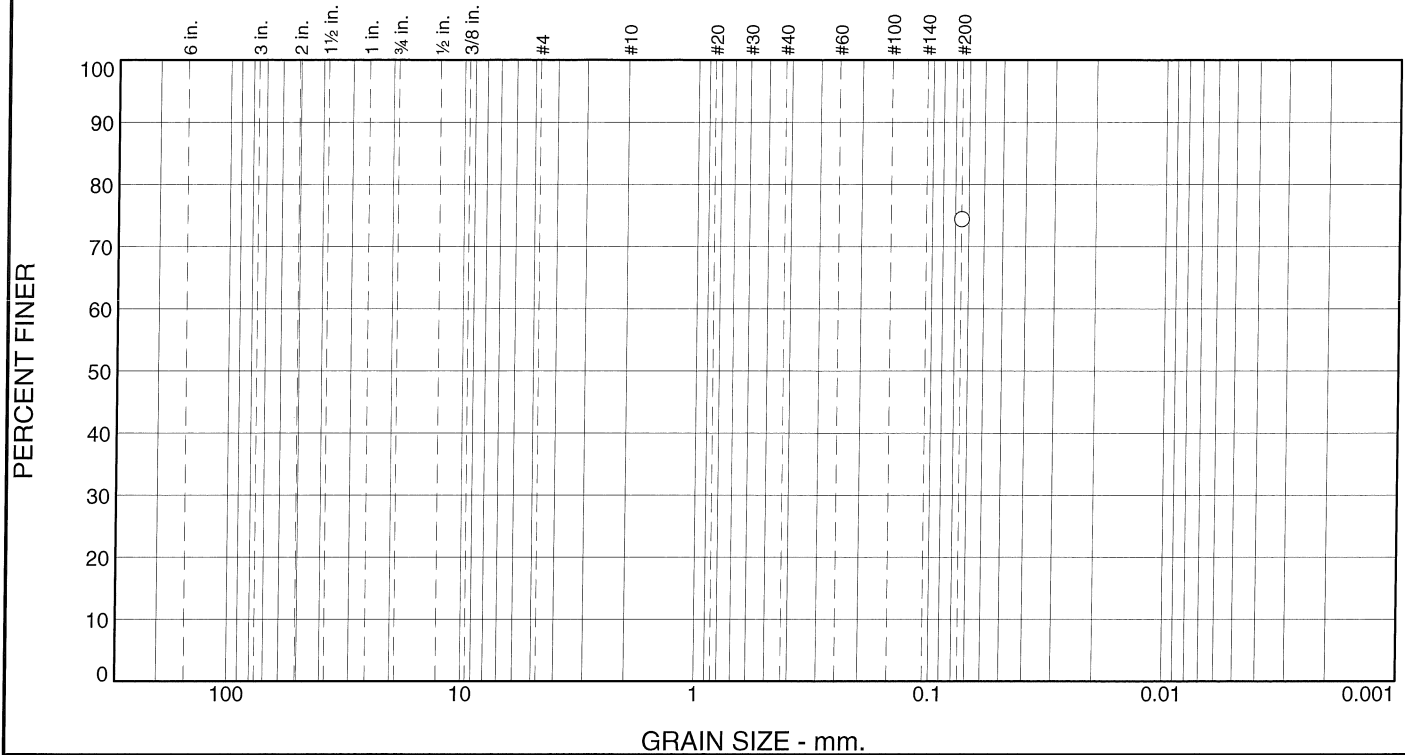
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	74.5		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 26   LL= 27   PI= 1

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0010R, S22
Sample Number: S35579   Depth: 85-86.4   Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA	**Client:** URS / HMM/ ARUP **Project:** CA High Speed Train Fresno to Bakersfield Geotech Investigation **Project No:** 11-111 **Figure**

Particle Size Distribution Report
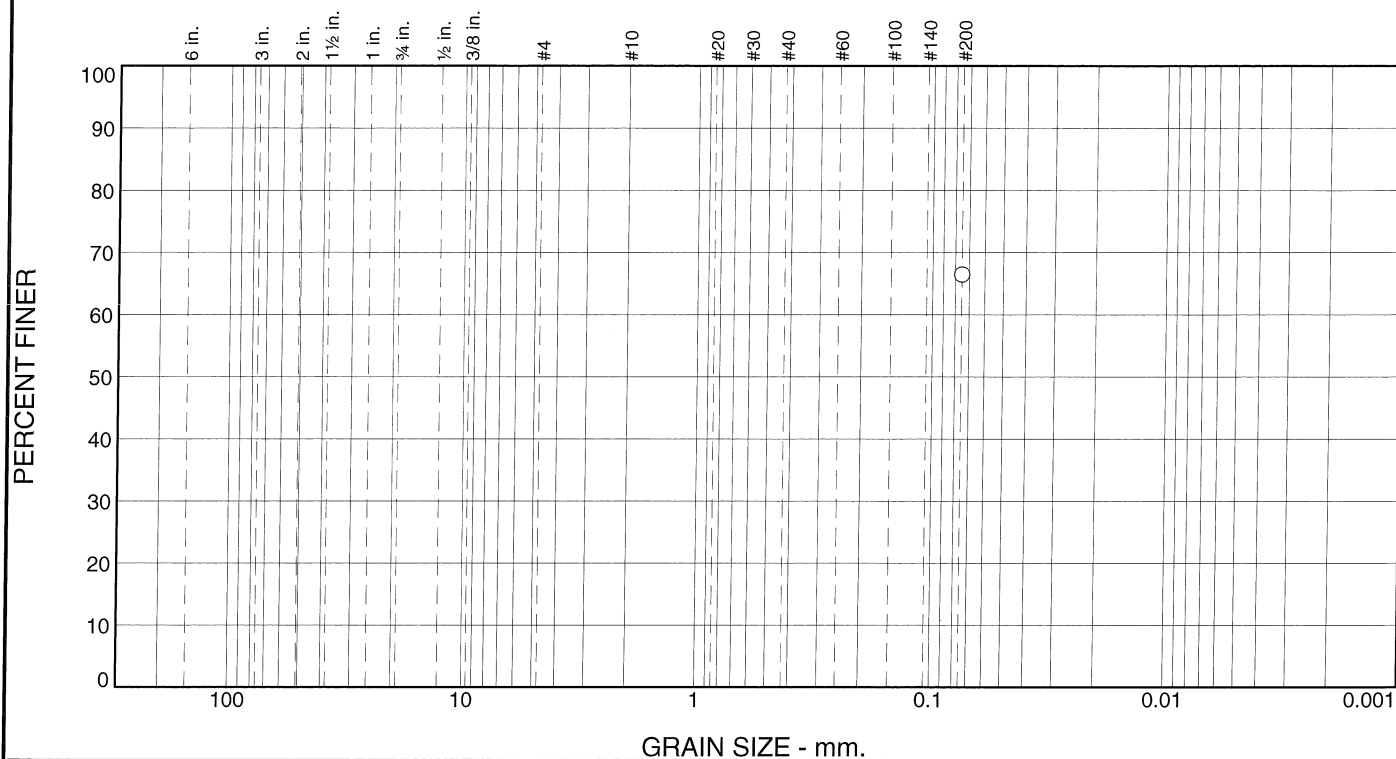
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						66.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	66.5		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0010R, S23
Sample Number: S35580   Depth: 90-91.3

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
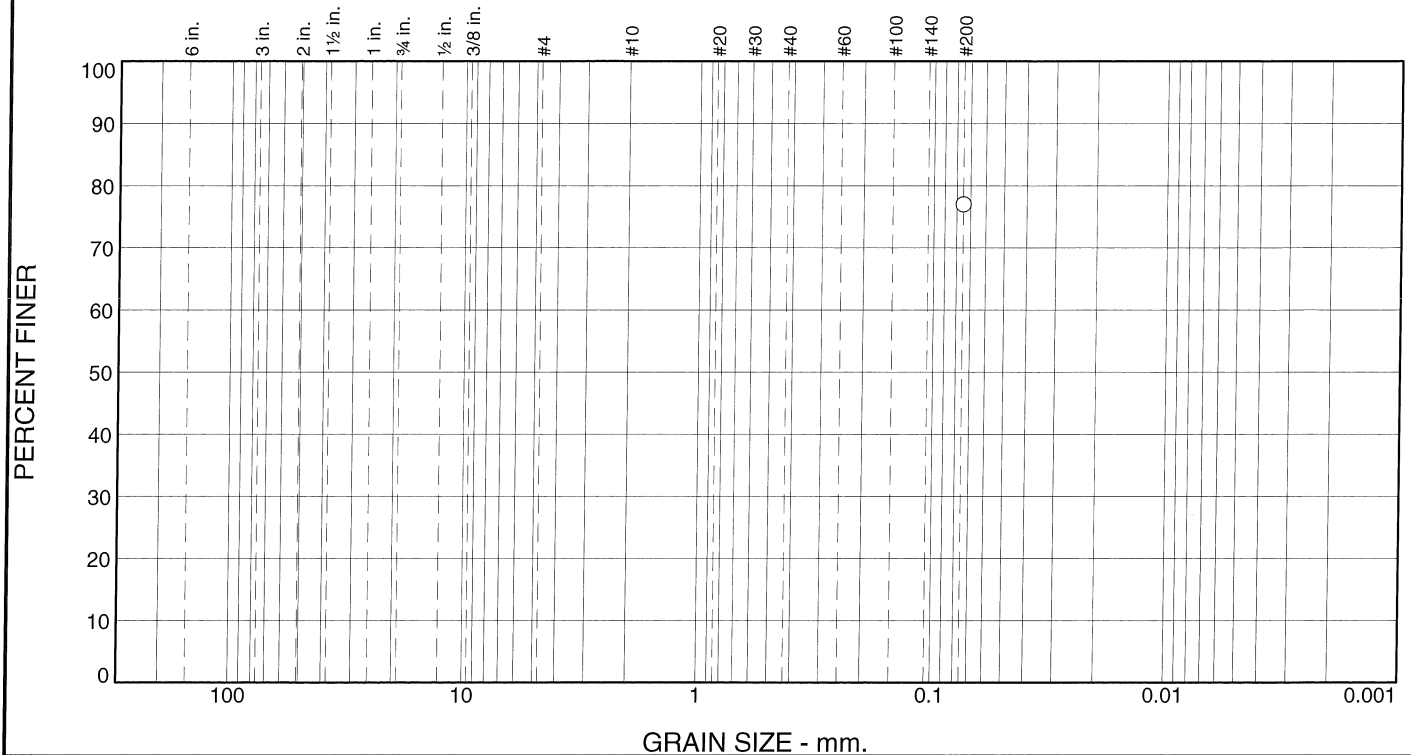
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	77.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

Location: S0010R, S26A

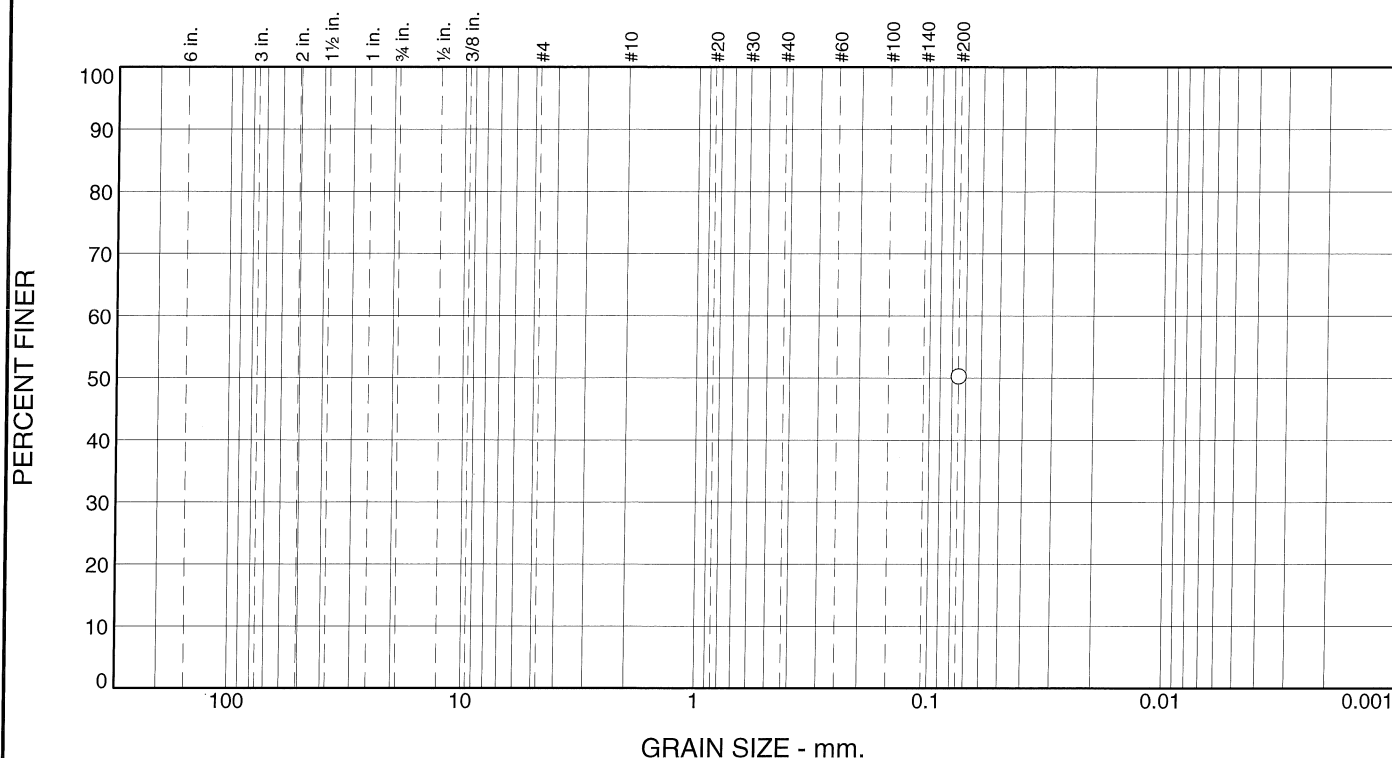Sample Number: S35582   Depth: 105-106.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						31.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	31.9		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

* (no specification provided)

Location: S0010R, S27
Sample Number: S35583   Depth: 110-111.5
Date Sampled:

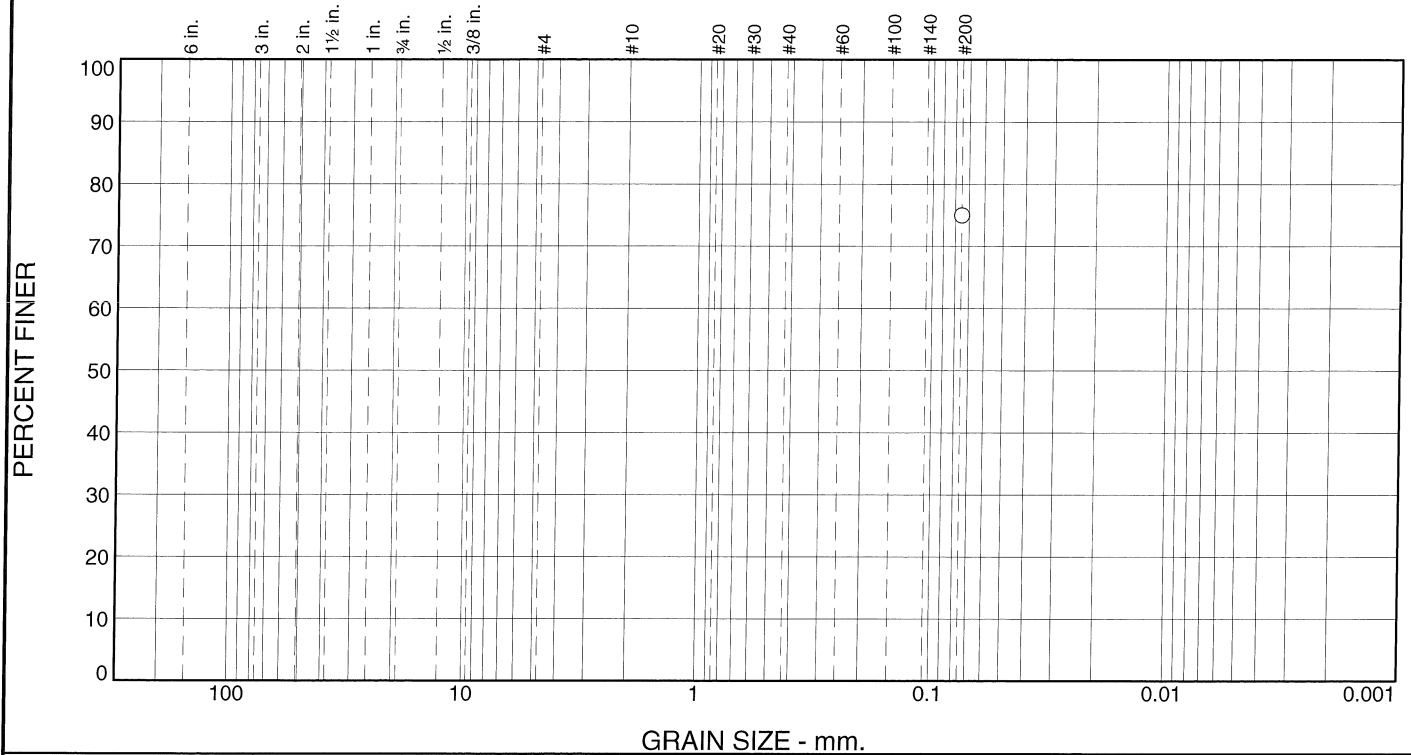**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
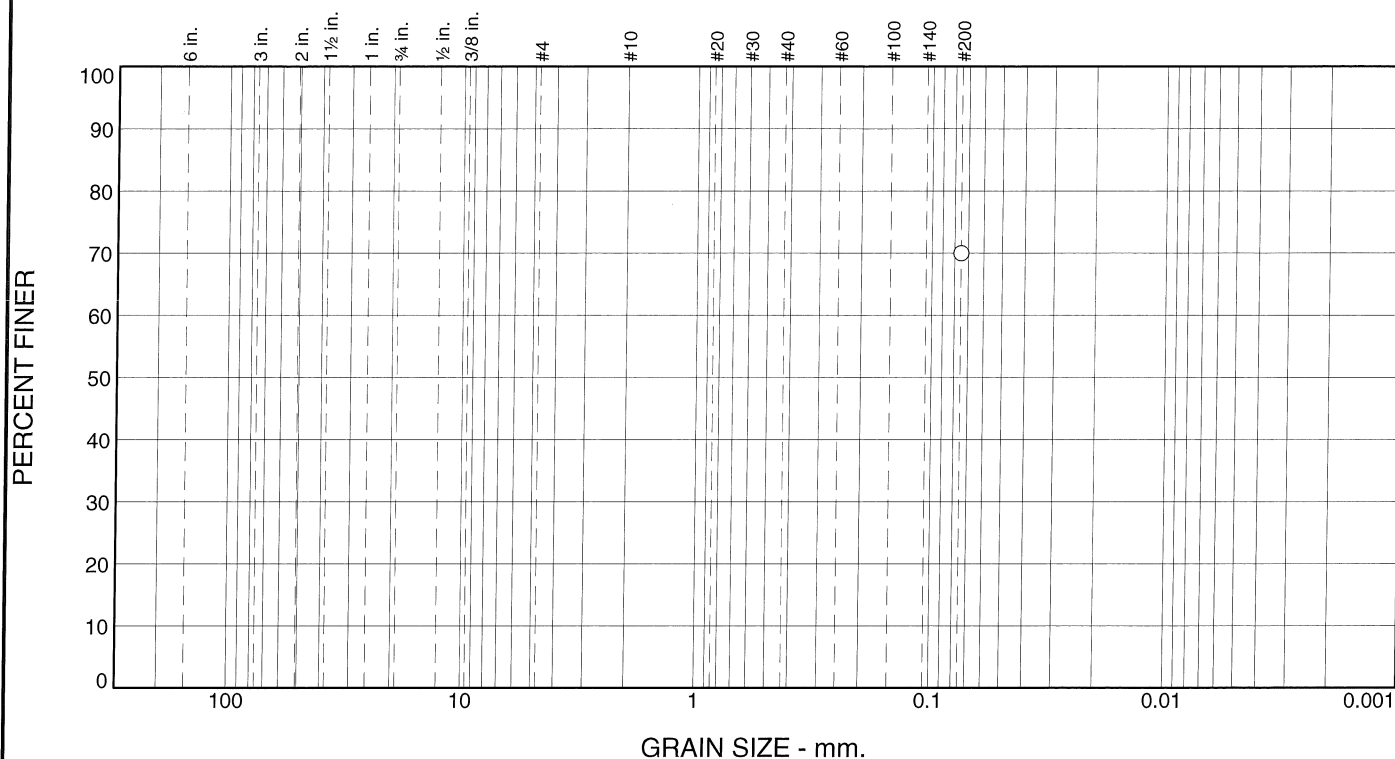
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						70.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	70.0		

Material Description

Atterberg Limits (ASTM D 4318)
PL= 32　　　　LL= 44　　　　PI= 12

Classification
USCS (D 2487)=　　　　AASHTO (M 145)=

Coefficients
D90=　　　　D85=　　　　D60=
D50=　　　　D30=　　　　D15=
D10=　　　　Cu=　　　　Cc=

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0010R, S30

Sample Number: S35584　　　**Depth:** 125-126.2

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111　　　**Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	46.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: js
Title: PM

Location: S0010R, S31
Sample Number: S35585   Depth: 130-131.5
Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
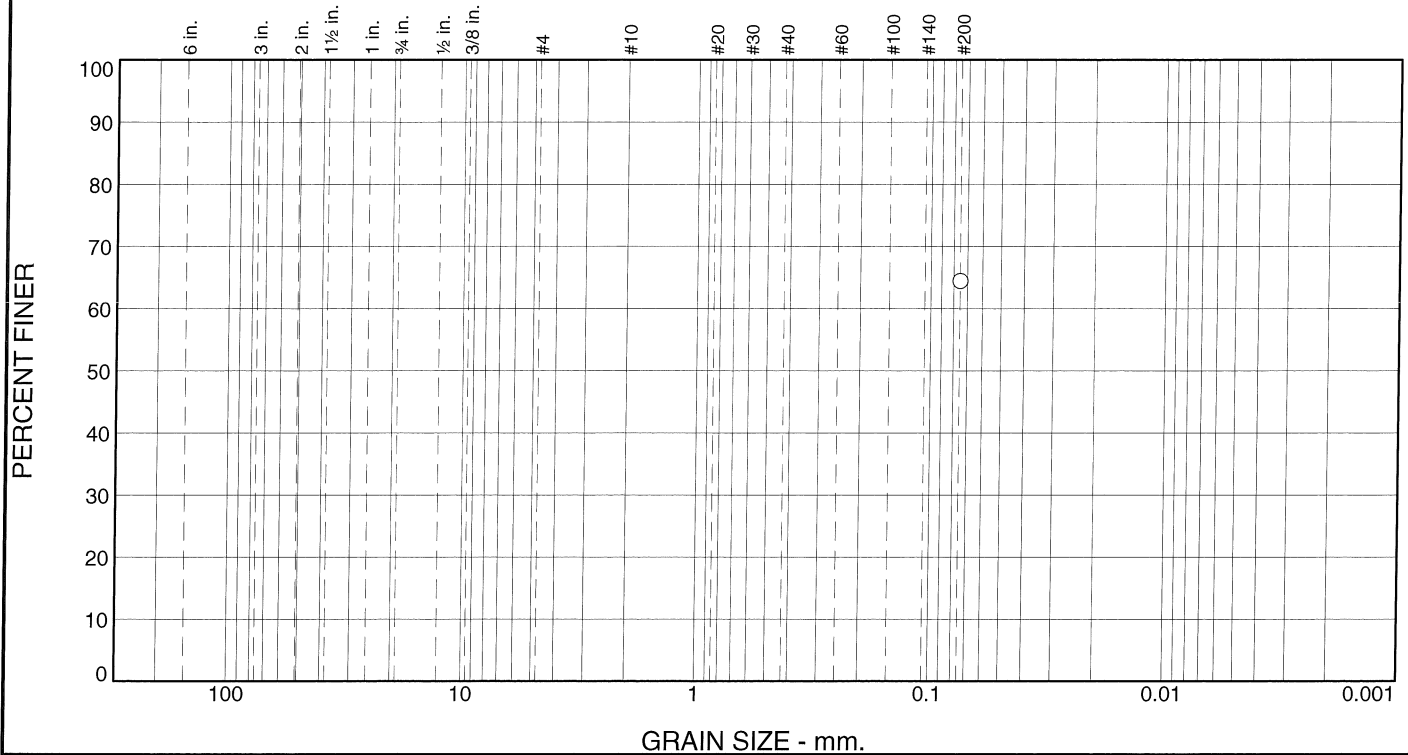
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.8		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: js

Title: PM

* (no specification provided)

Location: S0010R, S35

Sample Number: S35586   **Depth:** 150-151.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.
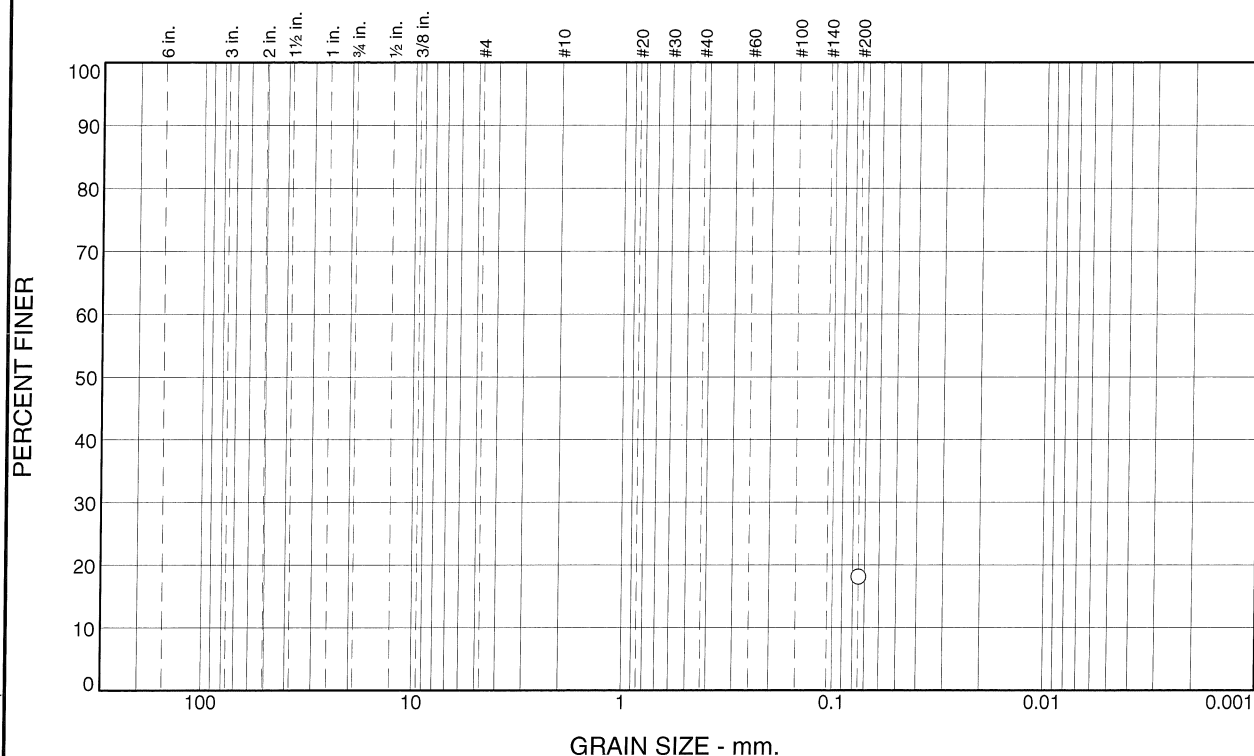
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						18.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	18.2		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0012R, S01
Sample Number: S36266   Depth: 0-5.0

Date Sampled:

## SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						20.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	20.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S02
Sample Number: S36267   **Depth:** 5-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
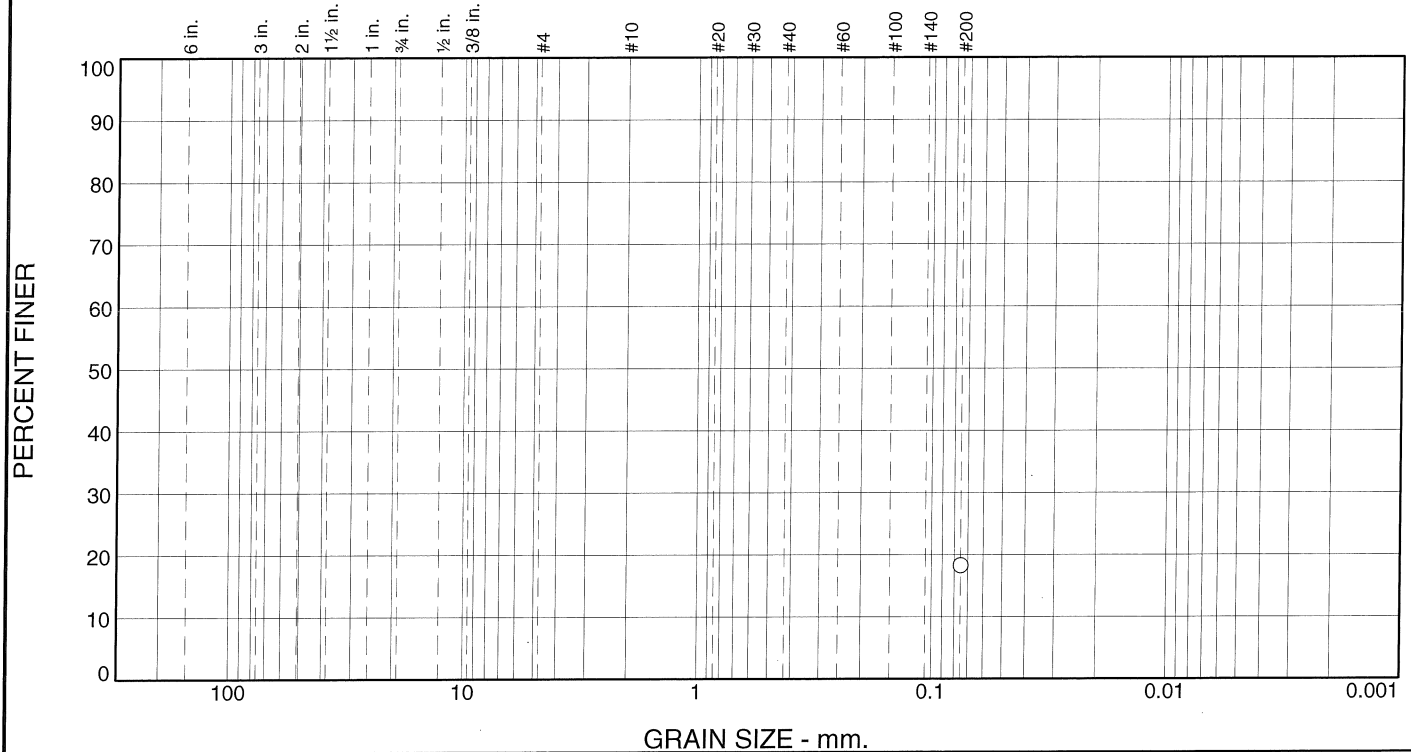
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						18.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	18.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11
Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S03
Sample Number: S35587　　　Depth: 6.5-7.7

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　Figure

Particle Size Distribution Report
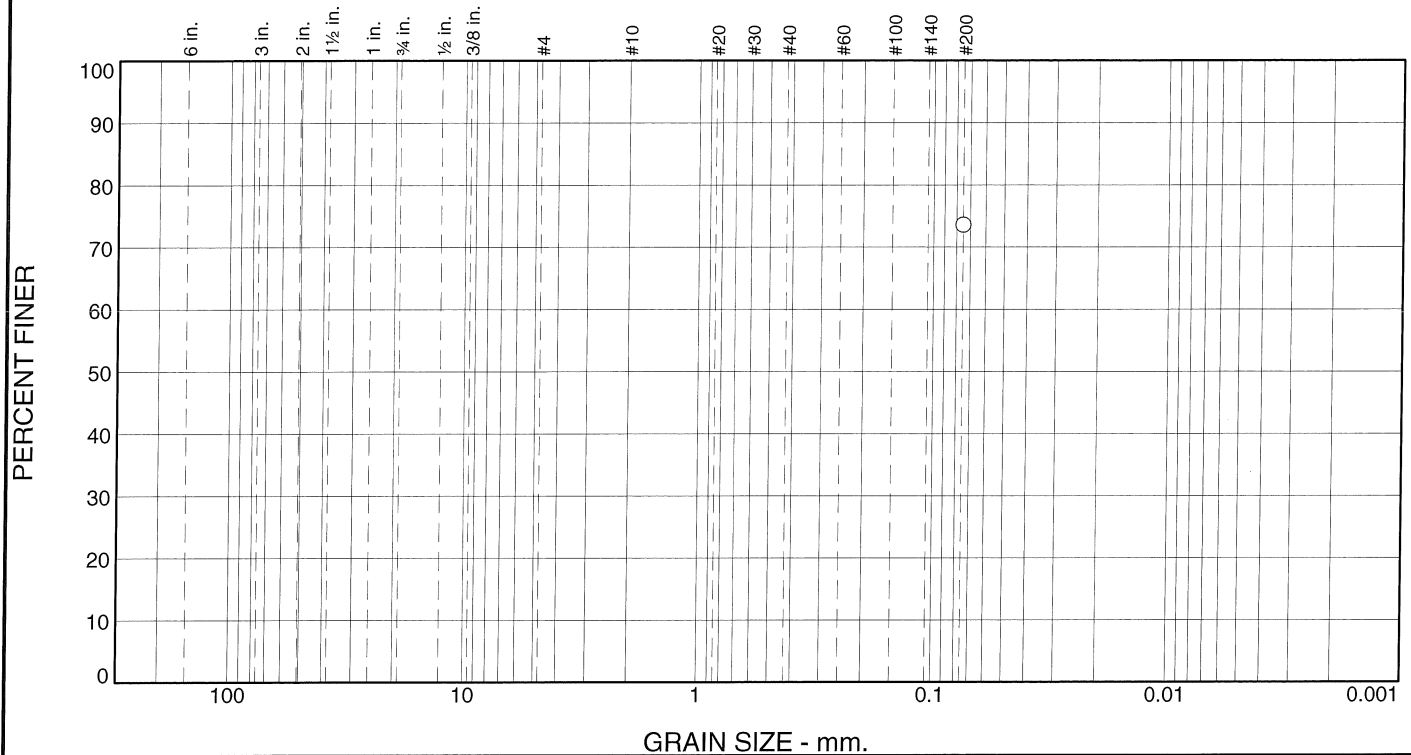
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.7		

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0012R, S05

Sample Number: S35588   Depth: 9.5-10.9

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

*(no specification provided)

Location: S0012R, S06
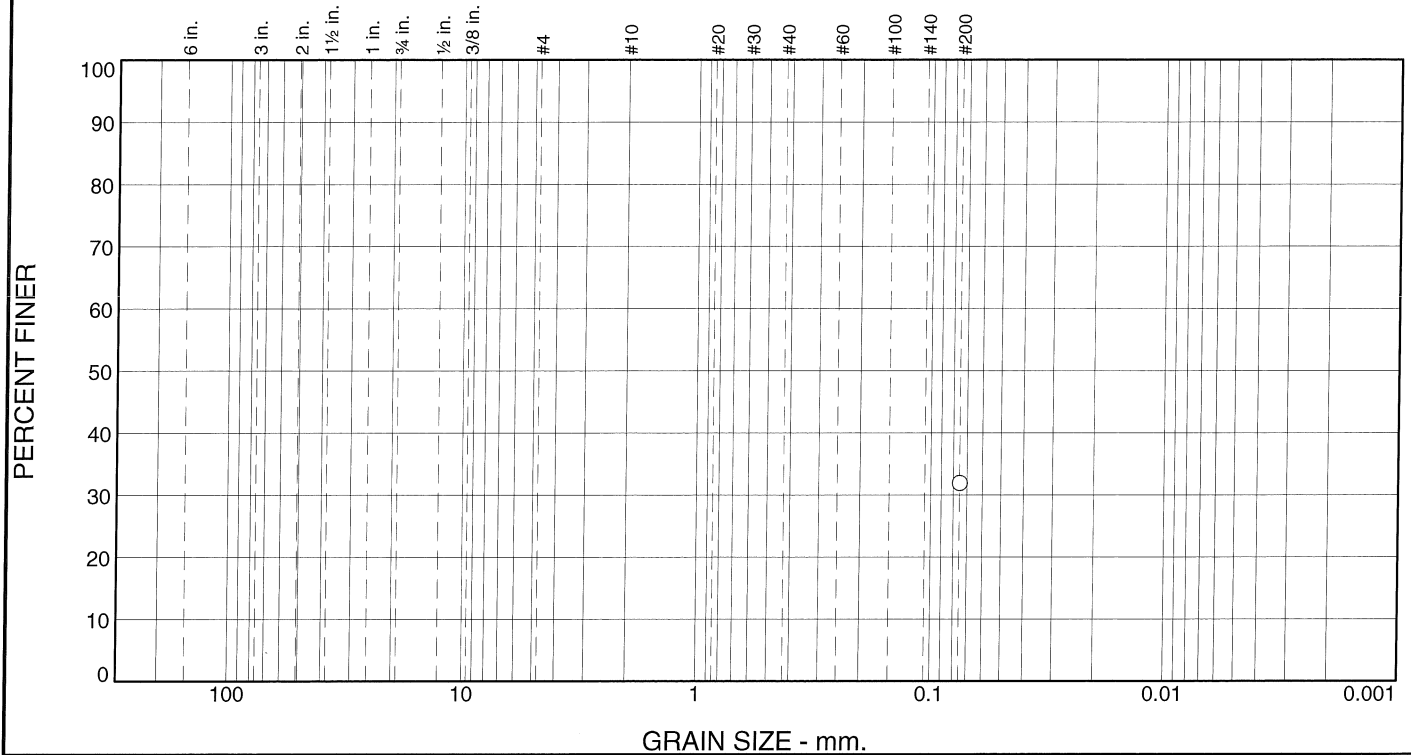Sample Number: S35589   Depth: 11-12.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
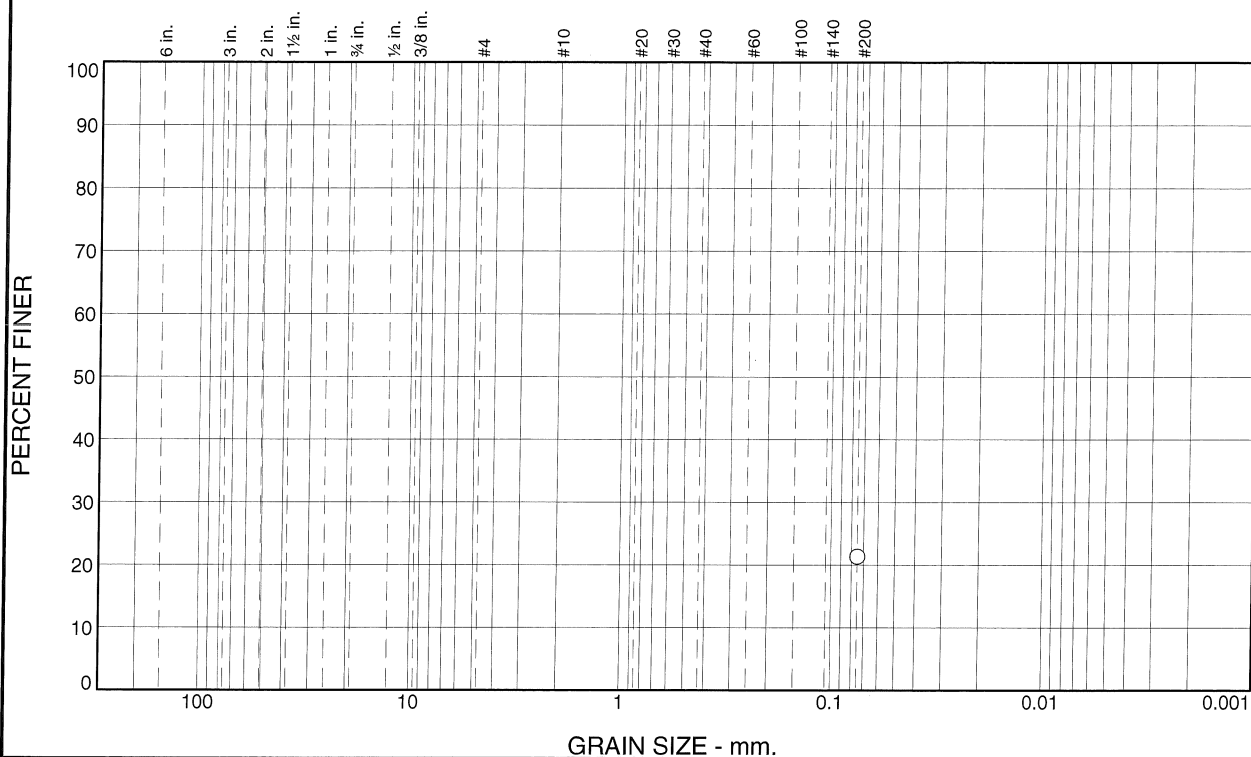
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						21.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	21.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S07
Sample Number: S36268   Depth: 12.5-13.8

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	37.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S08
Sample Number: S35590   Depth: 14-15.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
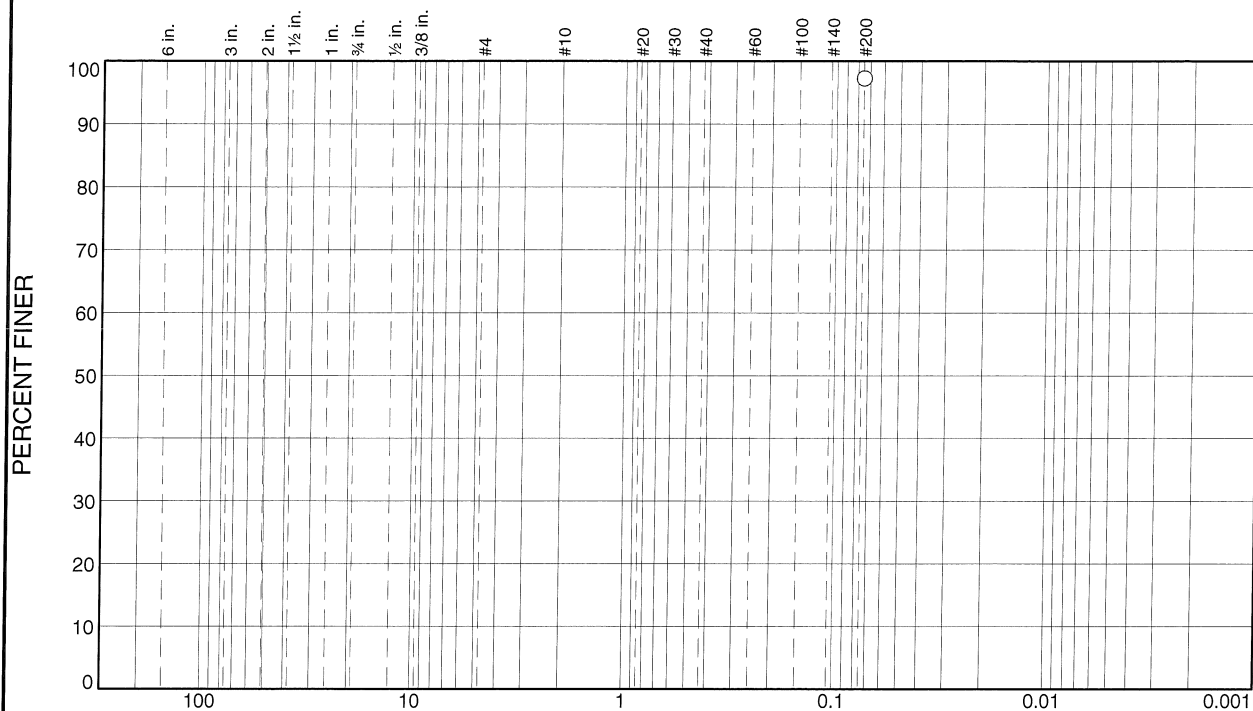
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						97.3	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	97.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S09A
Sample Number: S36269   Depth: 20-21.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
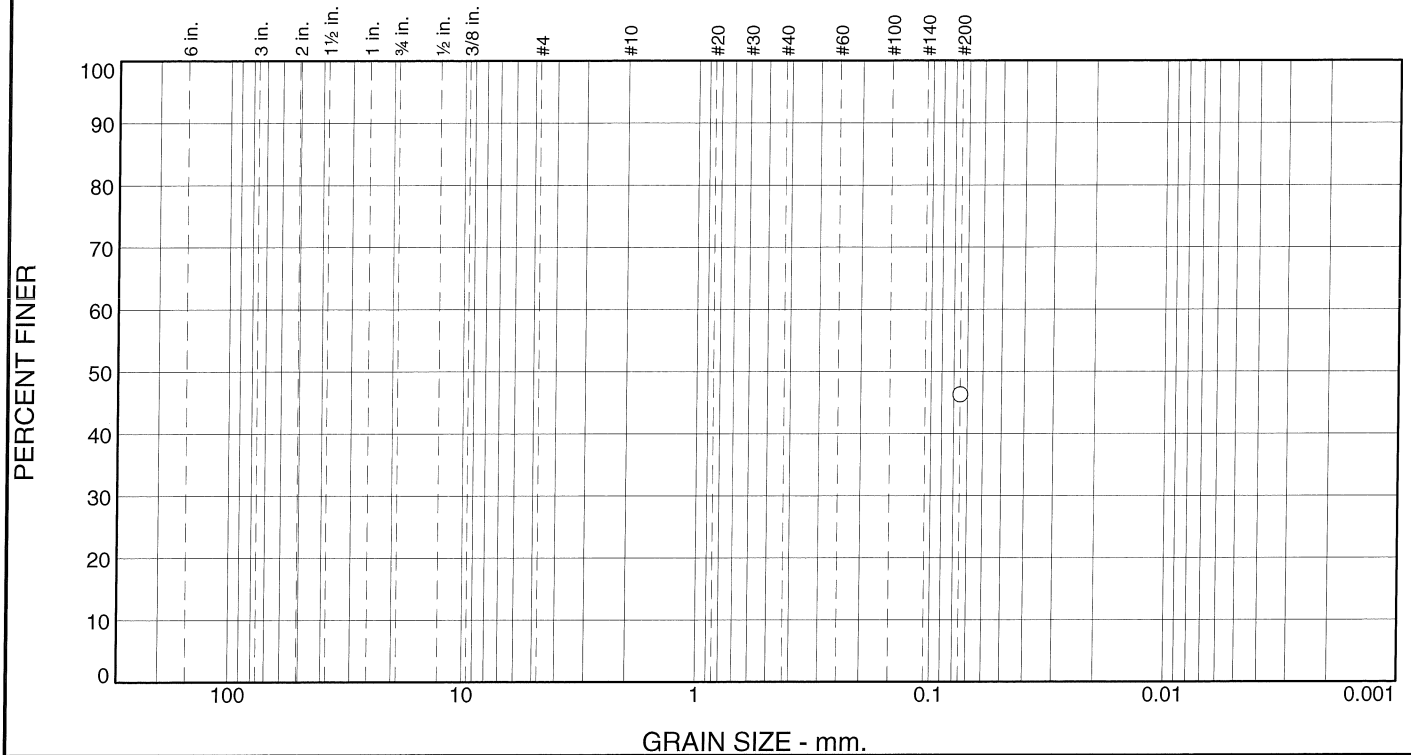
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
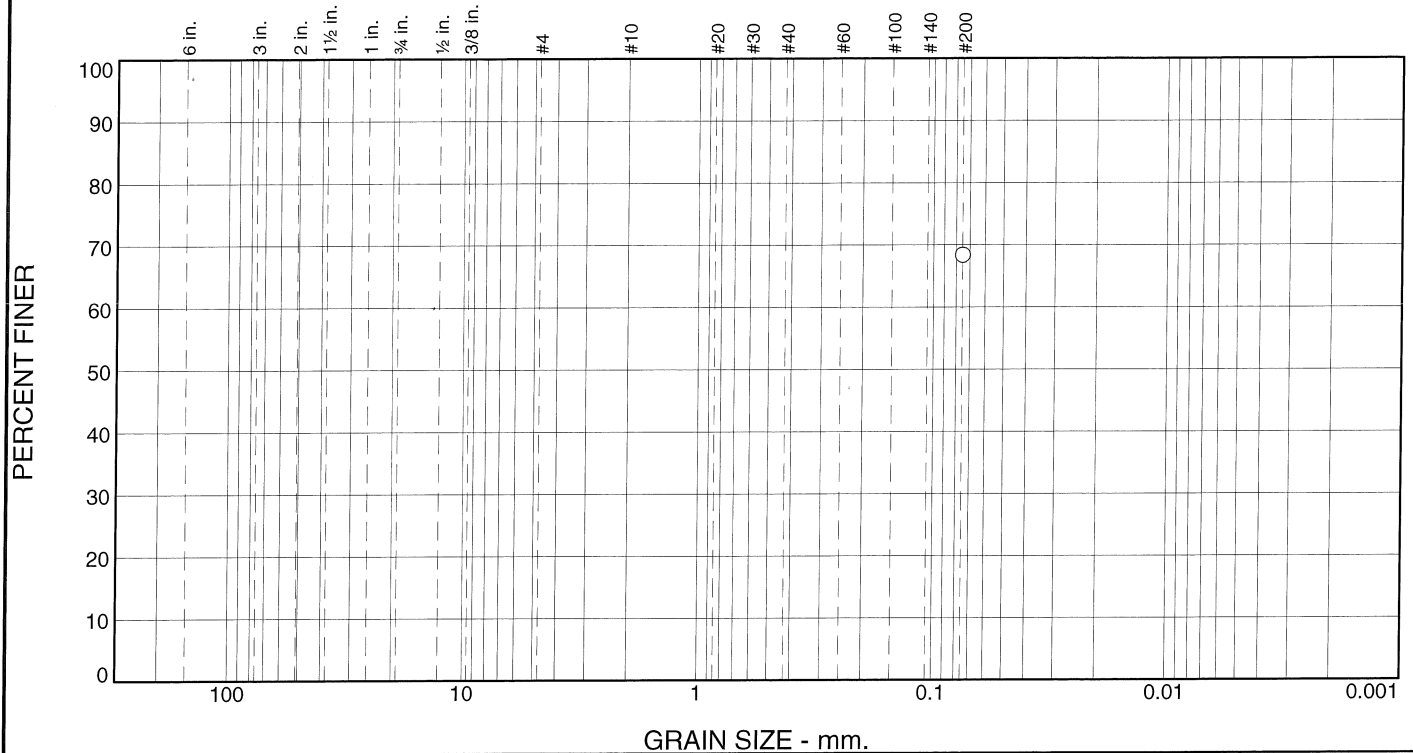
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	68.4		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0012R, S09B

Sample Number: S35591   Depth: 20-21.4

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
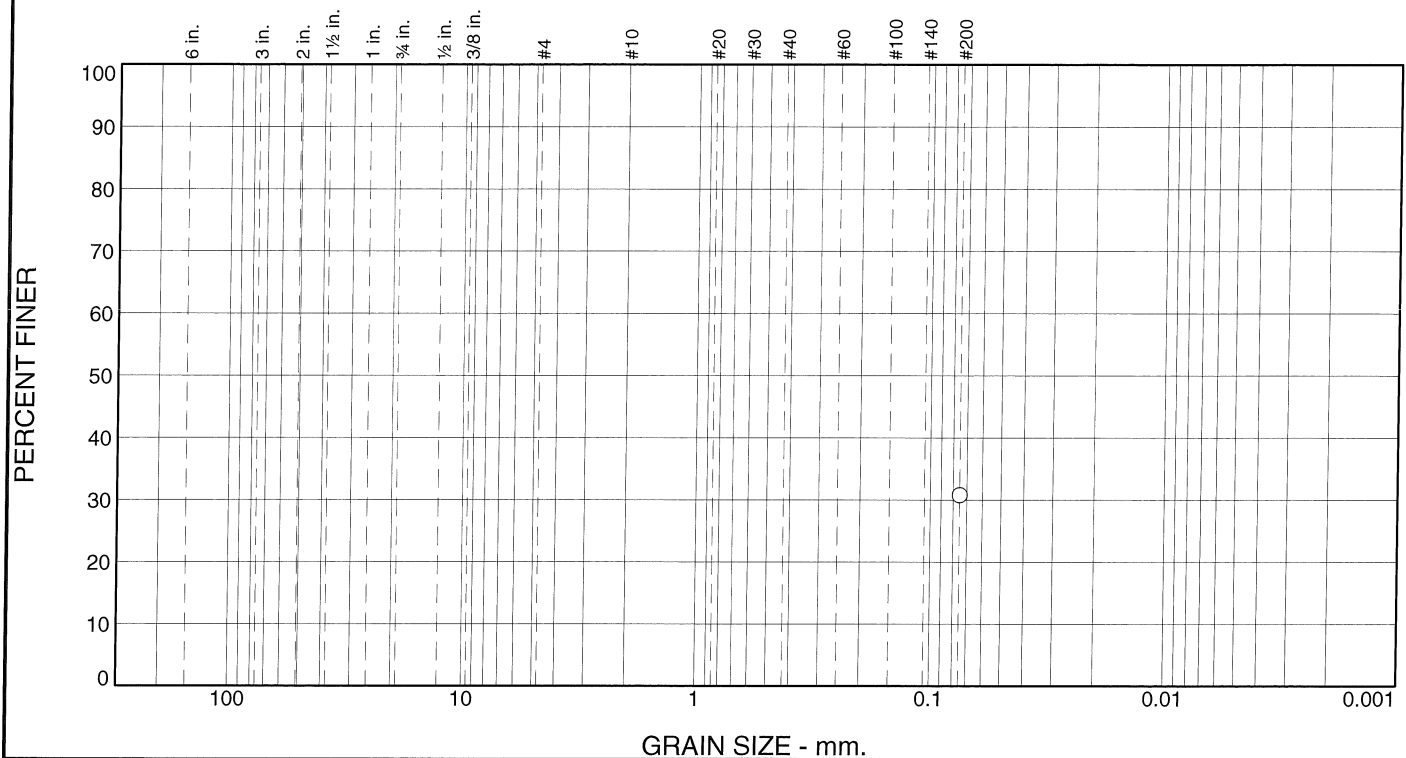
Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
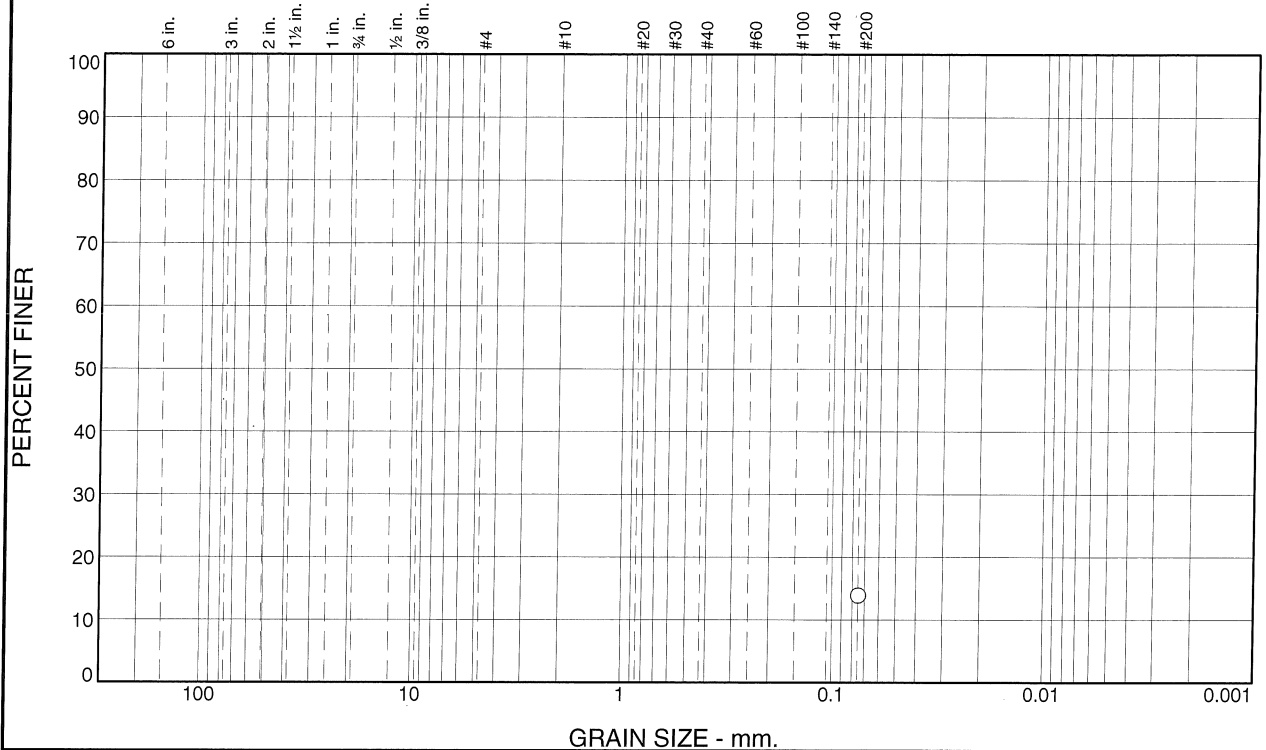
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						14.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	14.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S14
Sample Number: S36270   Depth: 45-46.4

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
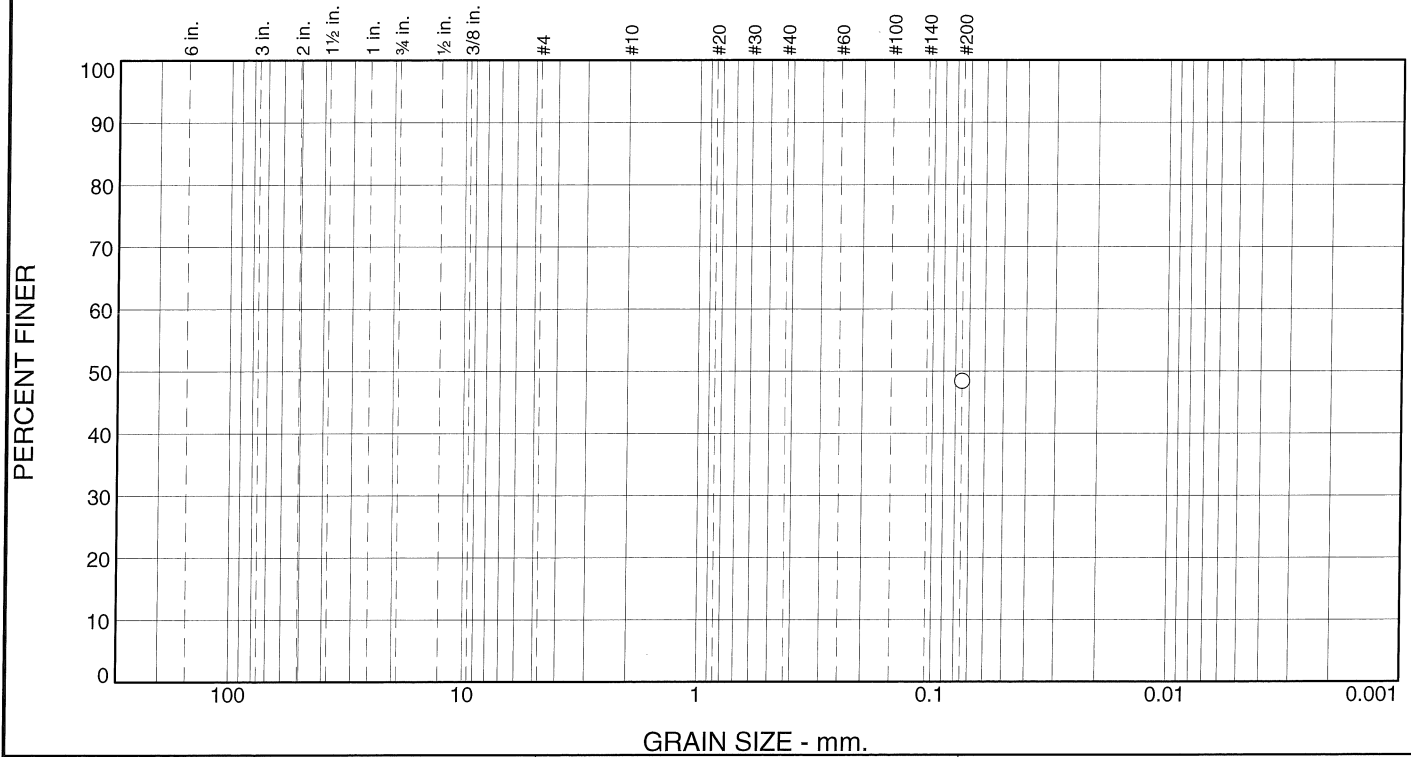
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						48.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	48.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S15
Sample Number: S35594   Depth: 50-51.5

Date Sampled:

**SIERRA TESTING LABS, INC.**
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	50.1		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S19
Sample Number: S35597   Depth: 70-71.5

Date Sampled:

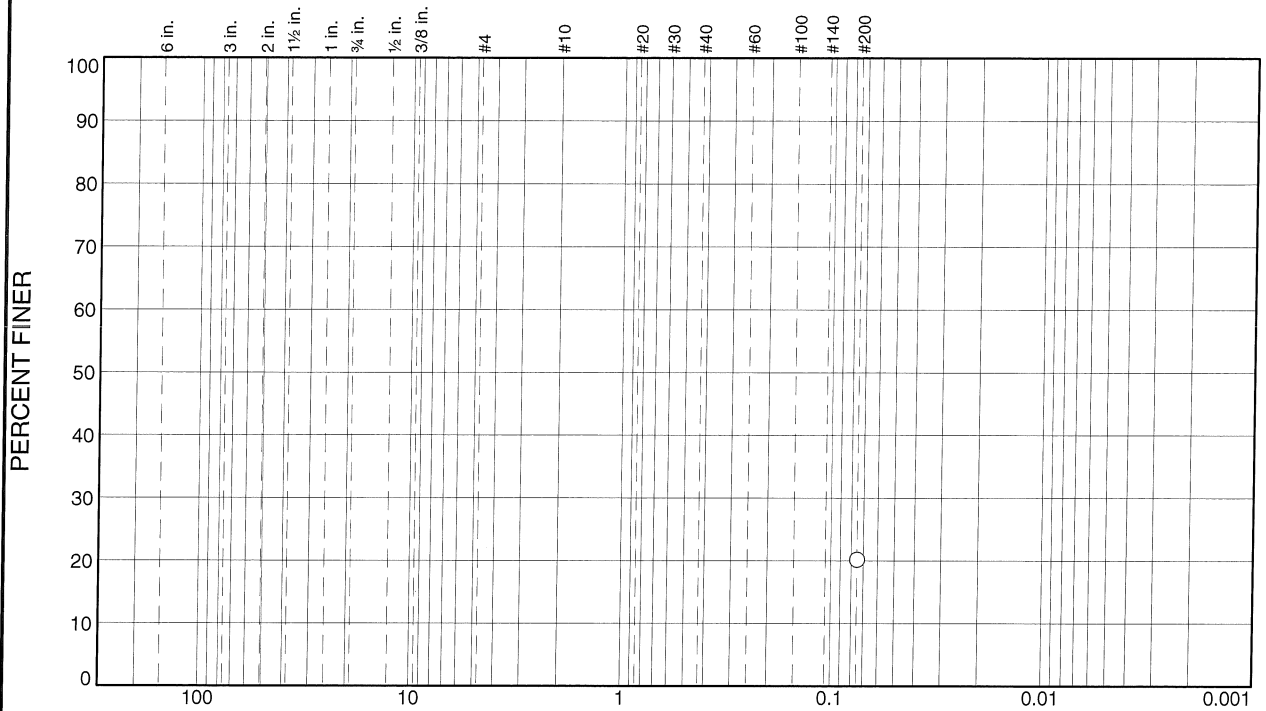**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
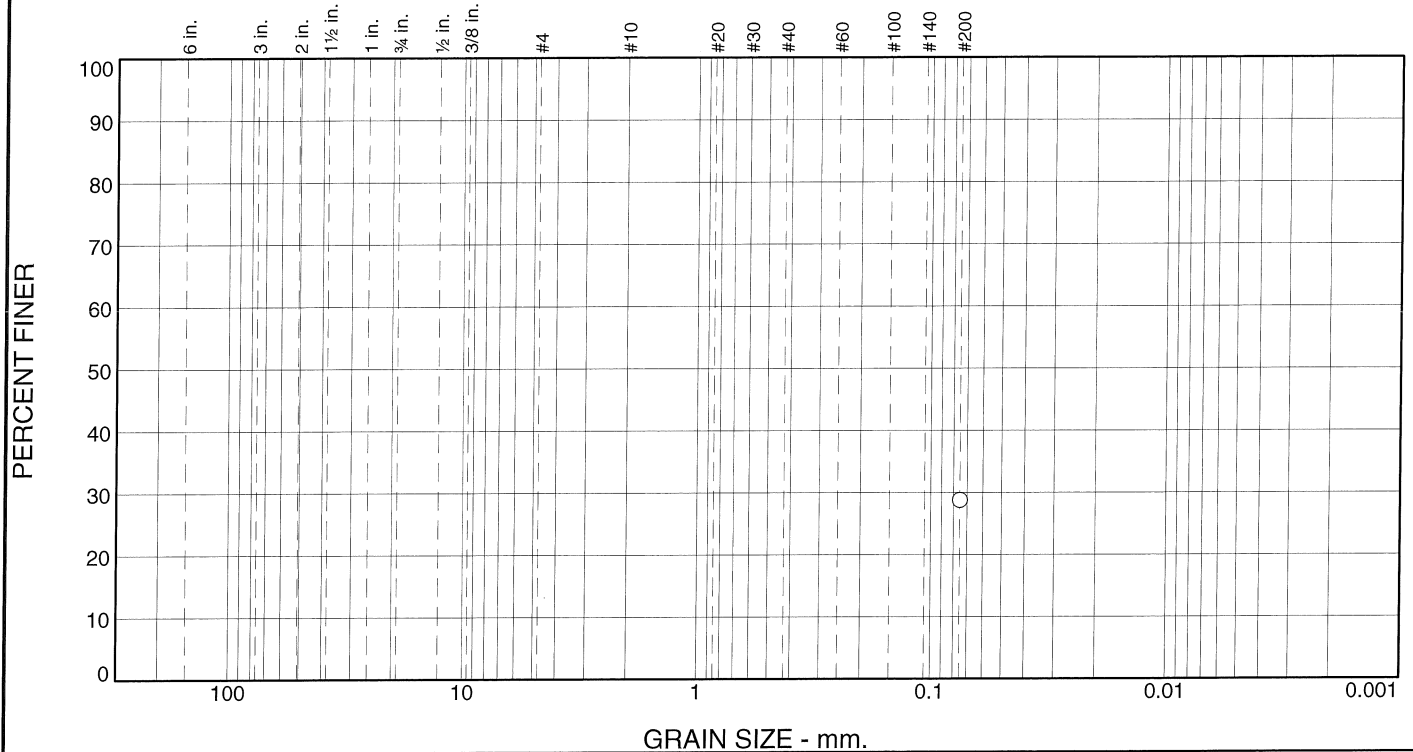
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						28.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	28.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S20

Sample Number: S35598   Depth: 75-75.8

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
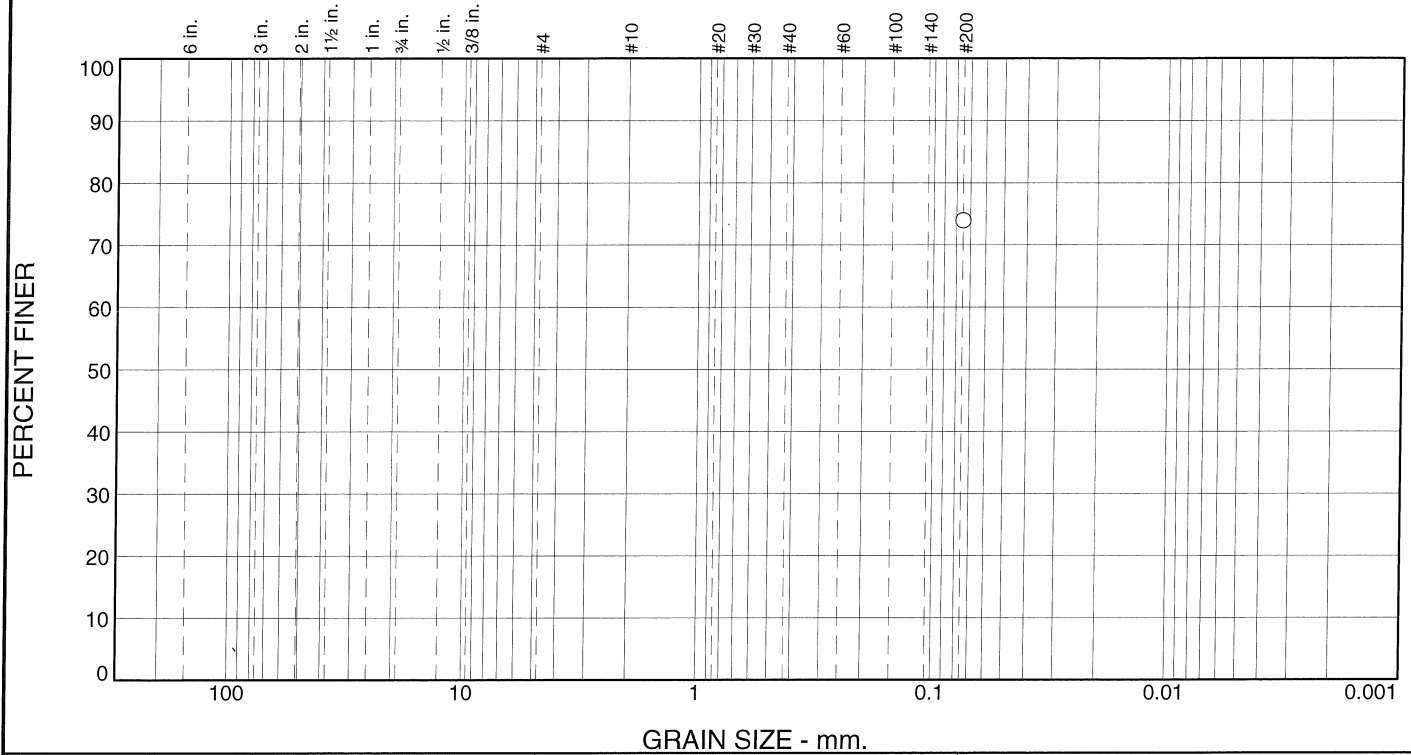
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	74.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S21

Sample Number: S35599   Depth: 80-81.2

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
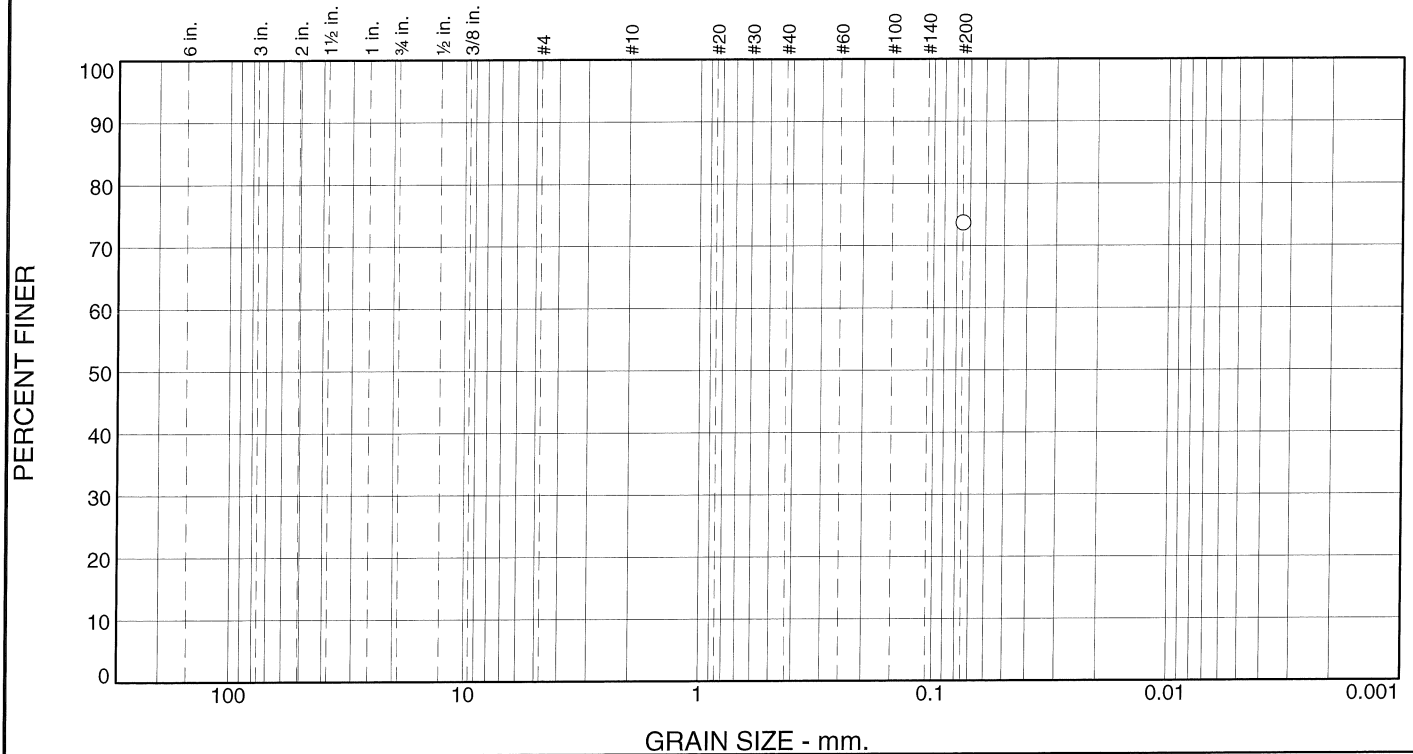
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S22
Sample Number: S35600   Depth: 85.5-86.3

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
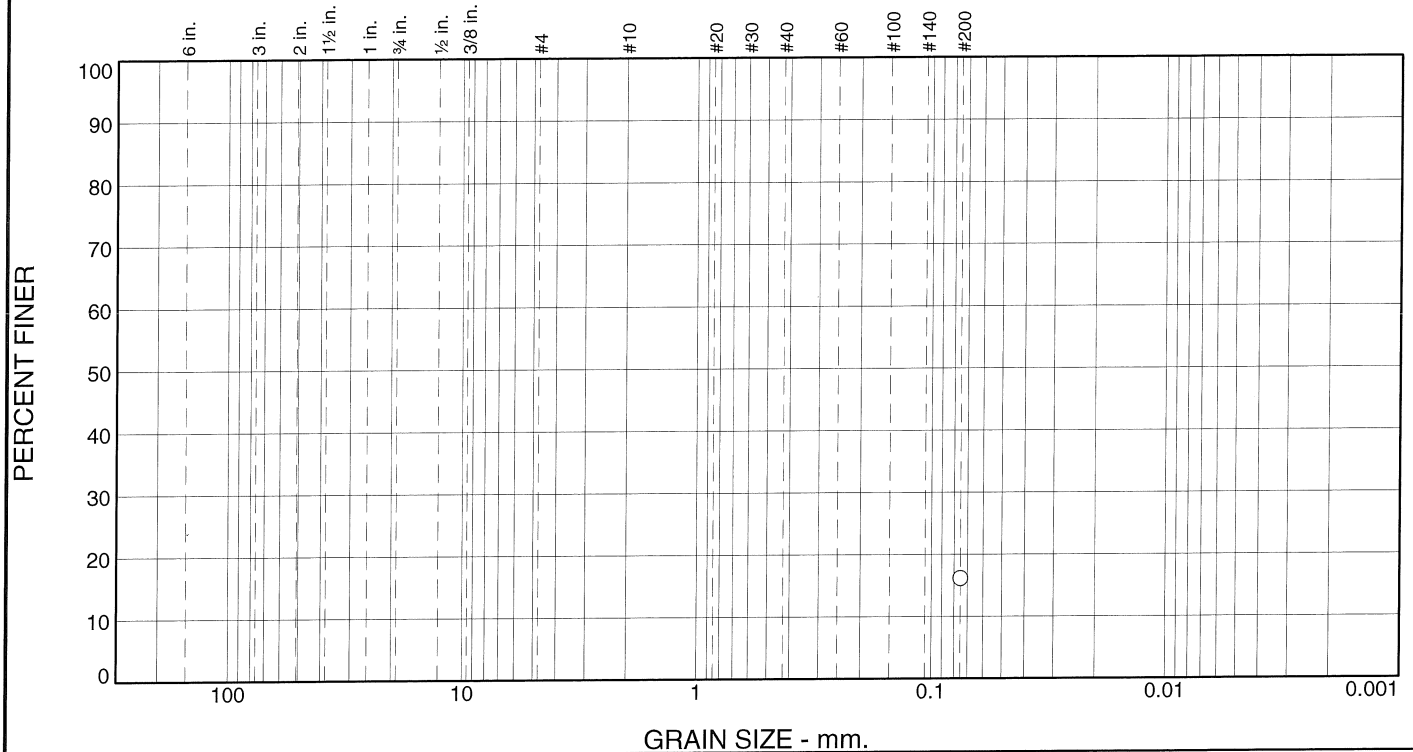
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						16.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	16.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S23
Sample Number: S35601   Depth: 90-91.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA
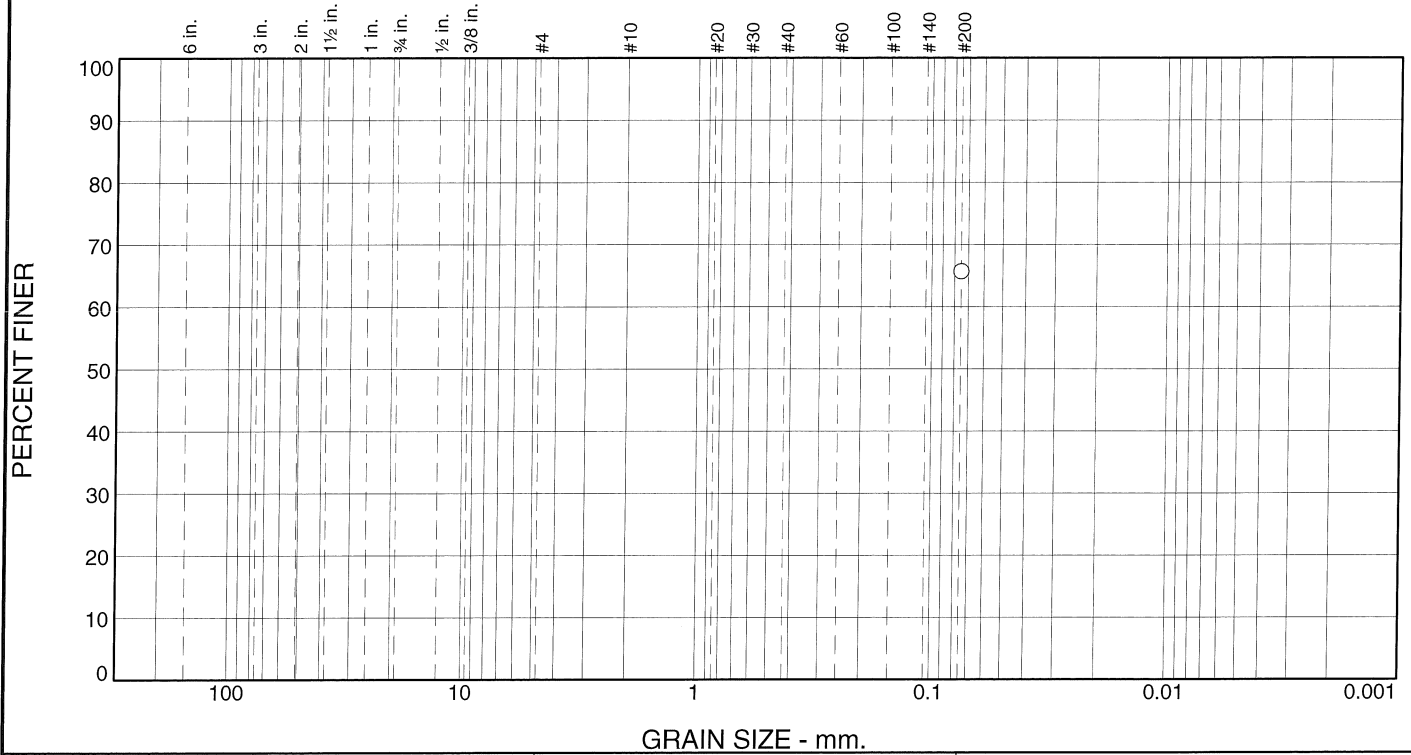
Client: URS / HMM/ ARUP
Project: CA High Speed Train
          Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
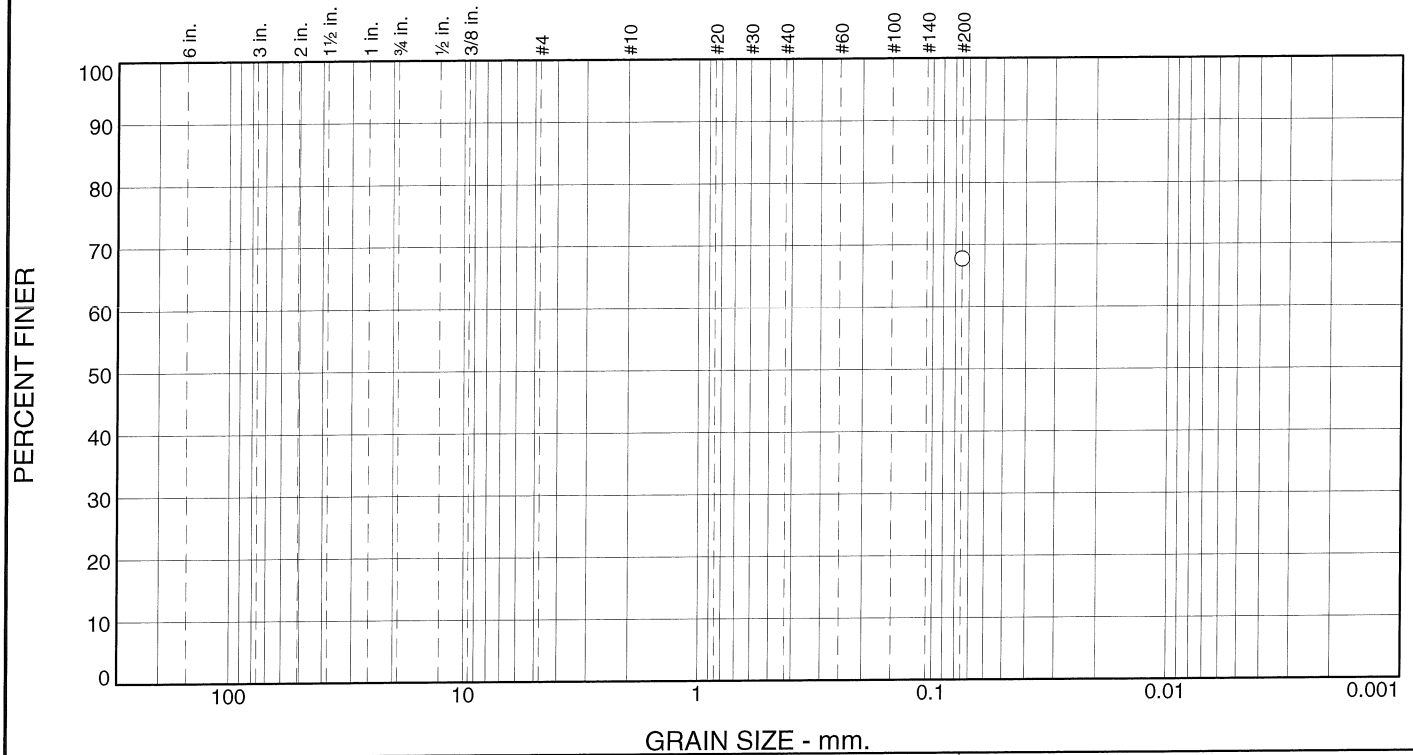
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						67.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	67.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S24
Sample Number: S35602   Depth: 95-96.3

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
          Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
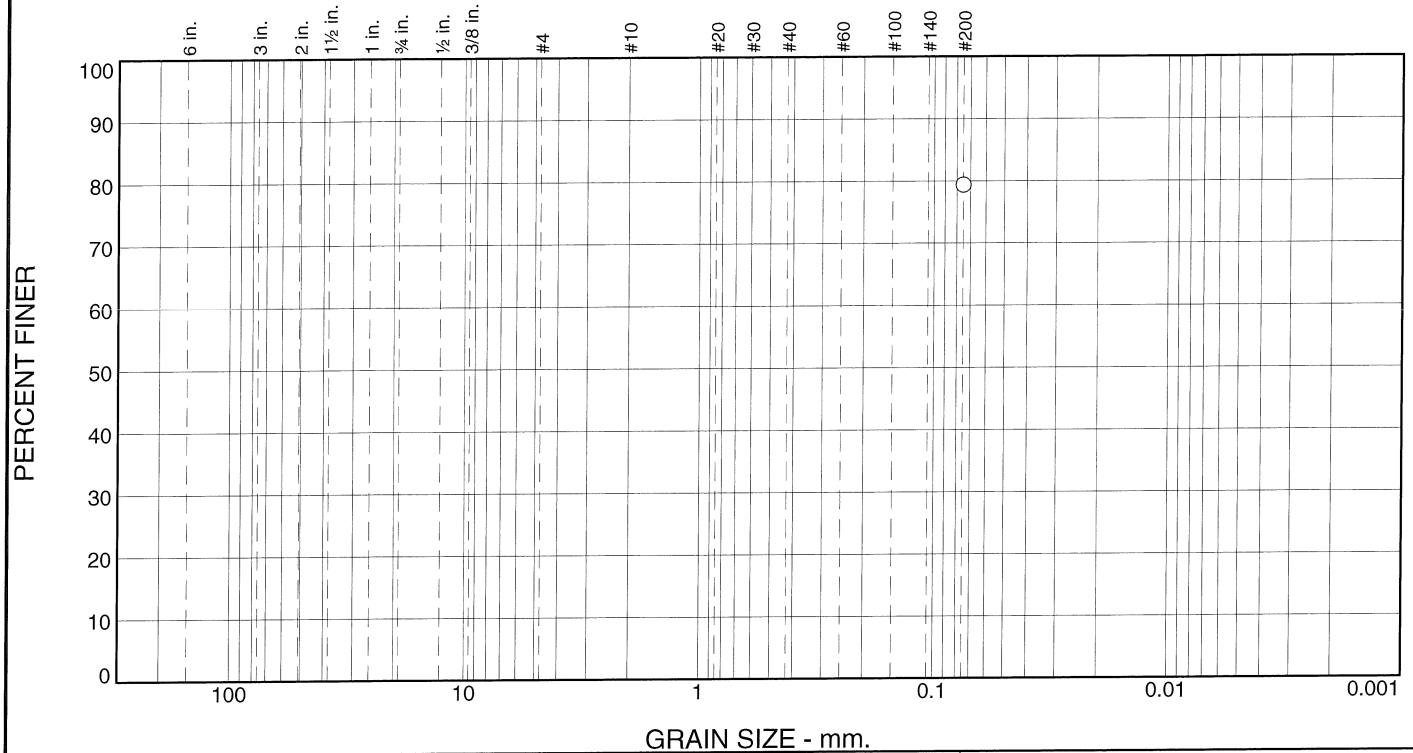
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	79.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S26
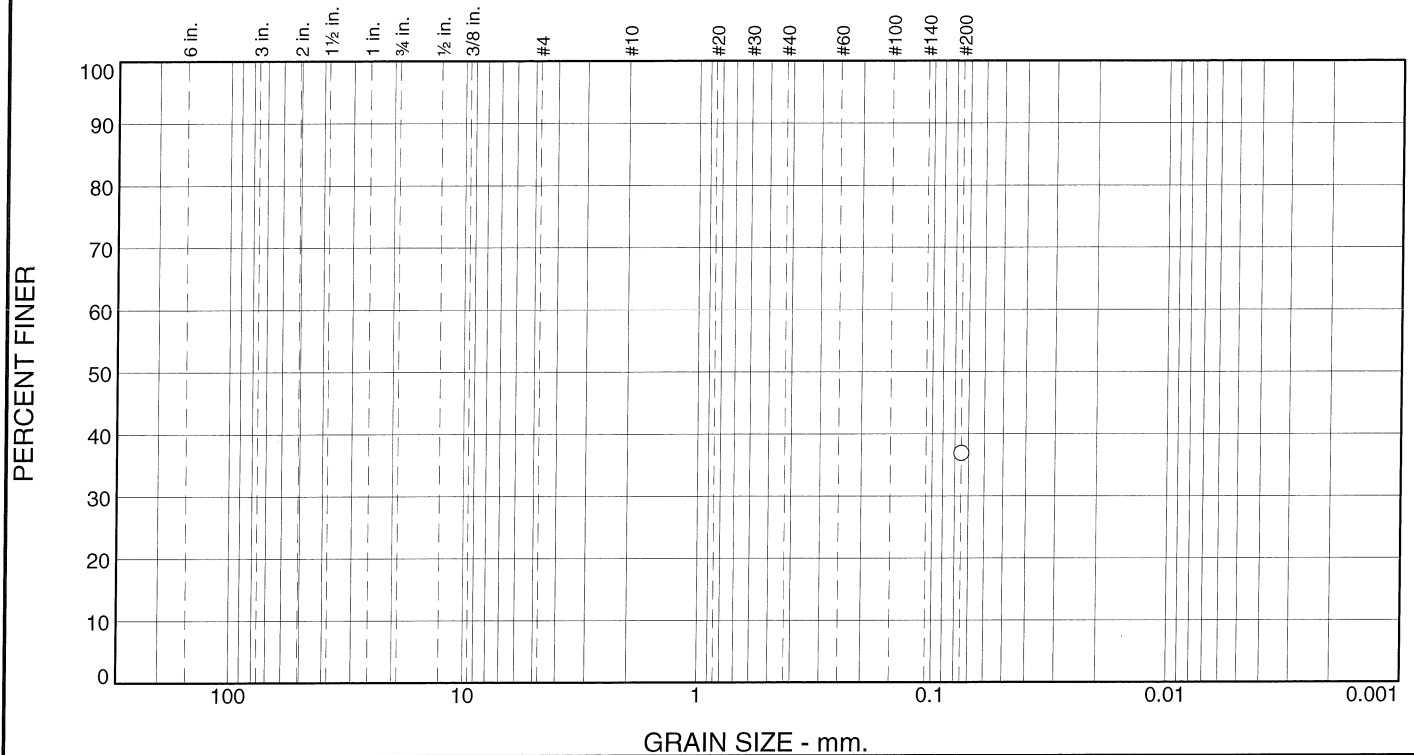Sample Number: S35603   Depth: 105-106.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.3		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0012R, S27
Sample Number: S35604   Depth: 110-111.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
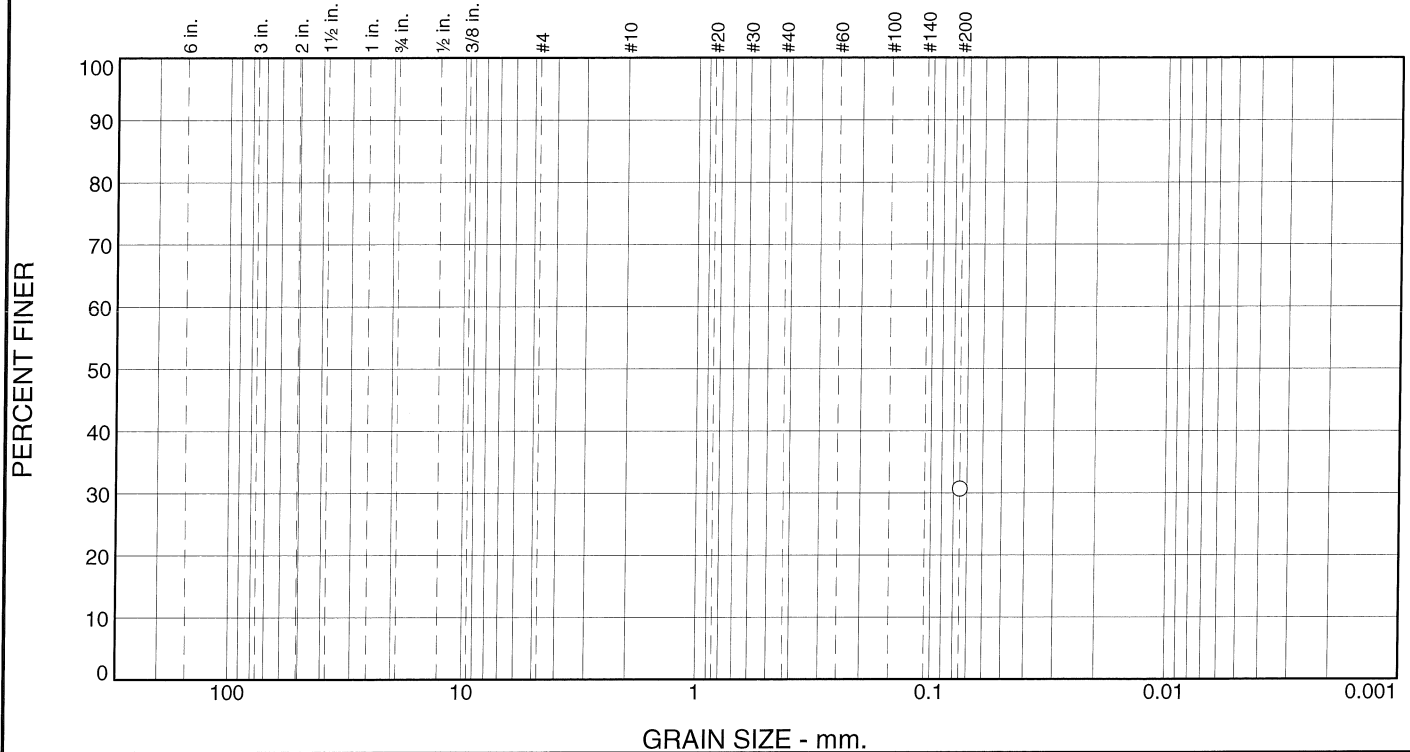
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.7		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S30
Sample Number: S35606   Depth: 125-126.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	56.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0012R, S32A

Sample Number: S35607   **Depth:** 135-135.8

Date Sampled:

**SIERRA
TESTING LABS, INC.
El Dorado Hills, CA**

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
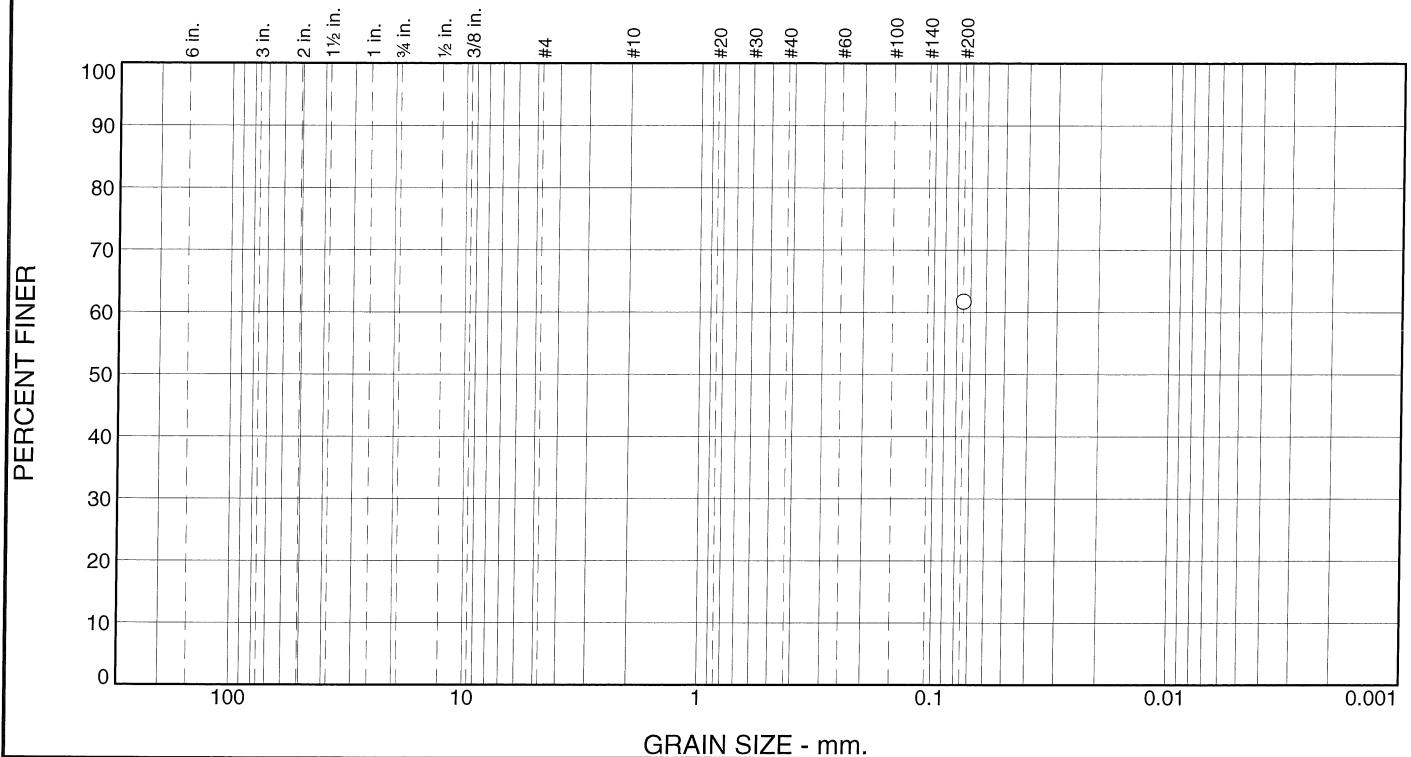
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	61.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　LL=　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　$D_{85}=$　　　$D_{60}=$
$D_{50}=$　　　$D_{30}=$　　　$D_{15}=$
$D_{10}=$　　　$C_u=$　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11
Tested By: ac^U

Checked By: cw

Title: PM

Location: S0012R, S35
Sample Number: S35609　　　Depth: 150-151.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　Figure

Particle Size Distribution Report
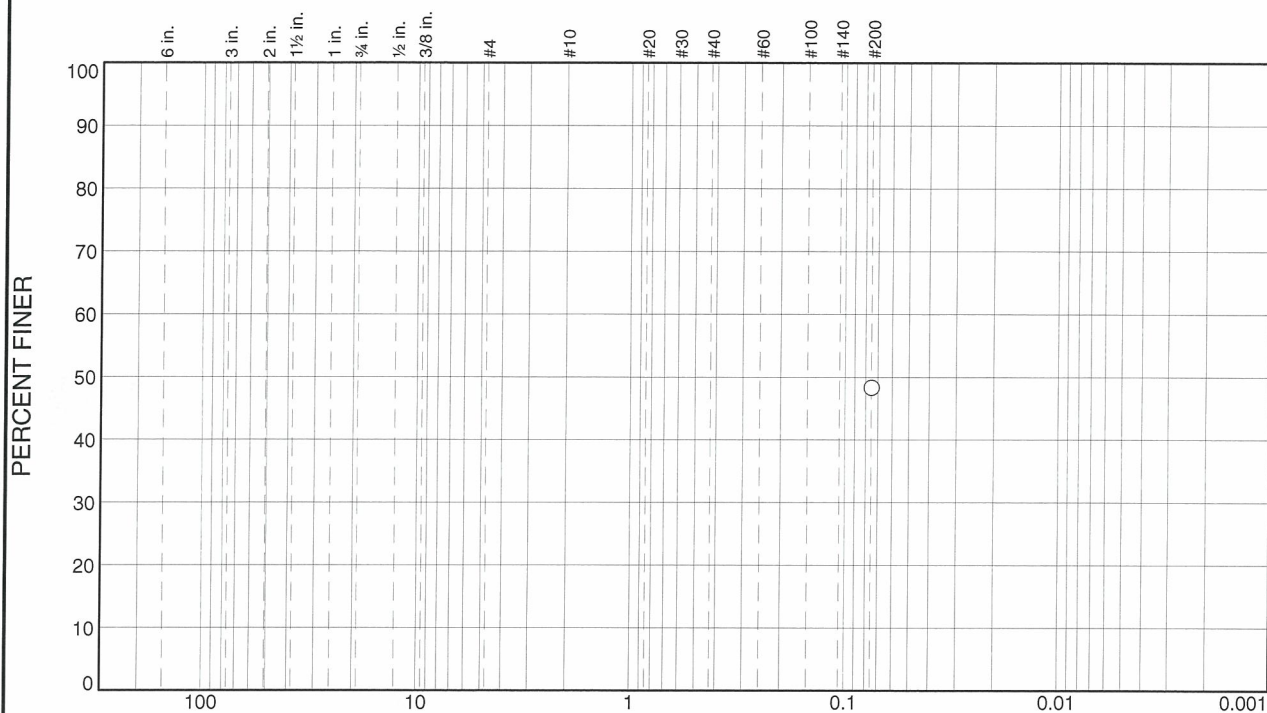
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						48.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	48.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0013AR, S01
Sample Number: S36271   **Depth:** 0-5.0

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0013AR, S03
Sample Number: S35610   **Depth:** 6.5-7.2

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
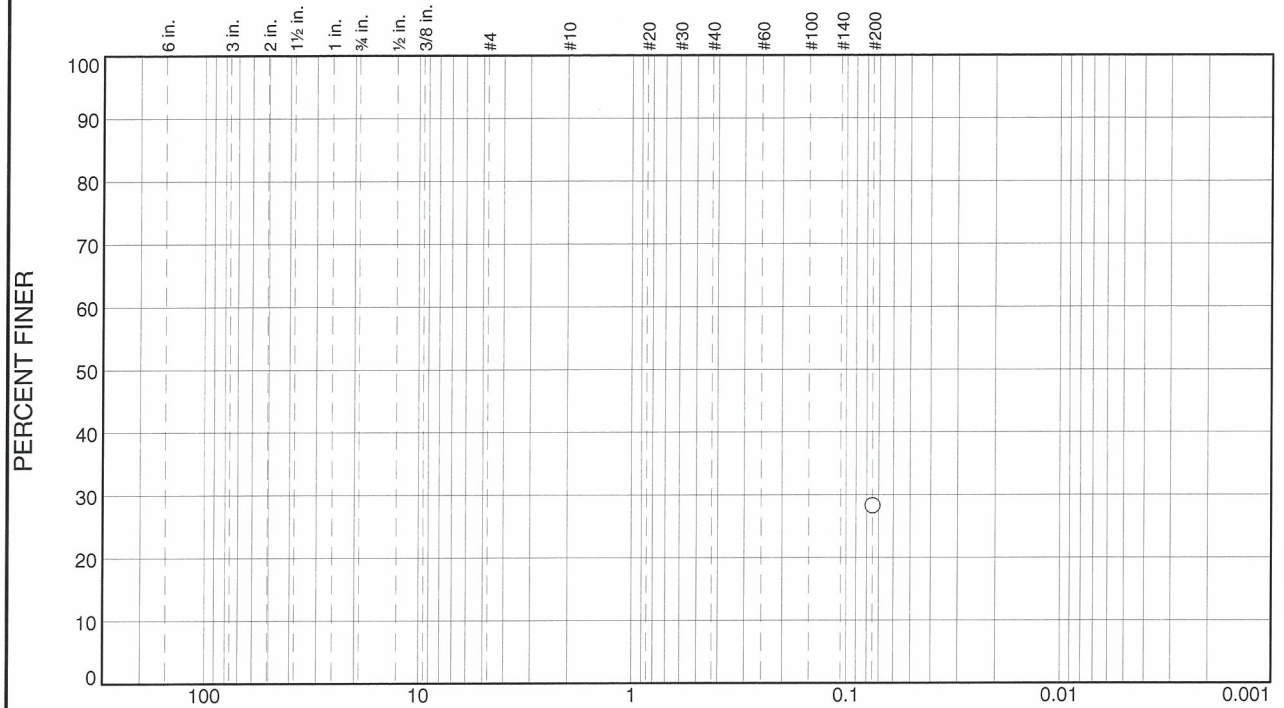
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						28.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	28.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0013AR, S04   **Date Sampled:**
Sample Number: S36272   **Depth:** 8-8.8

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
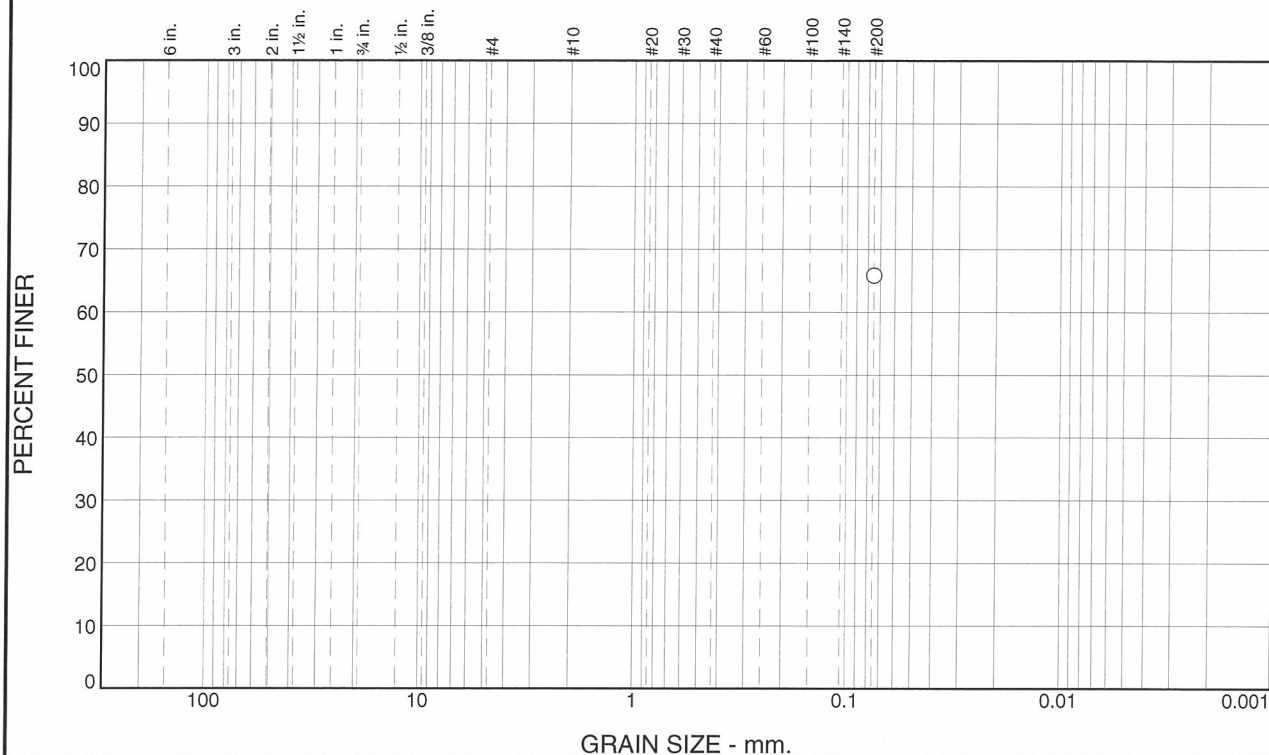
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0013AR, S05
Sample Number: S35611   **Depth:** 9.5-10.5

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER (y-axis: 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						47.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	47.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0013AR, S06A
Sample Number: S36273   Depth: 11-11.7

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.4		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S06B
Sample Number: S35612   Depth: 11.7-12.5

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
          Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	75.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0013AR, S07
Sample Number: S35613   Depth: 12.5-13.5
Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0013AR, S08
Sample Number: S36274   Depth: 14-15.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
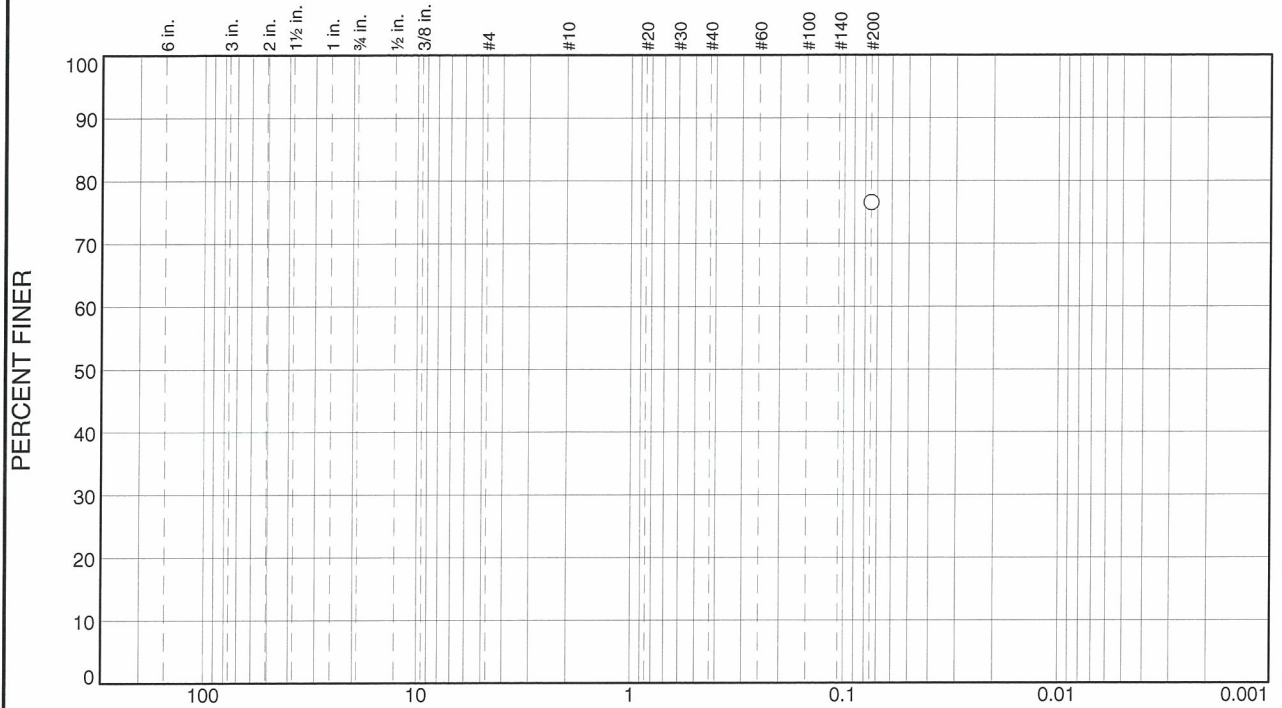
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	76.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S09

Sample Number: S35614   **Depth:** 20-21.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
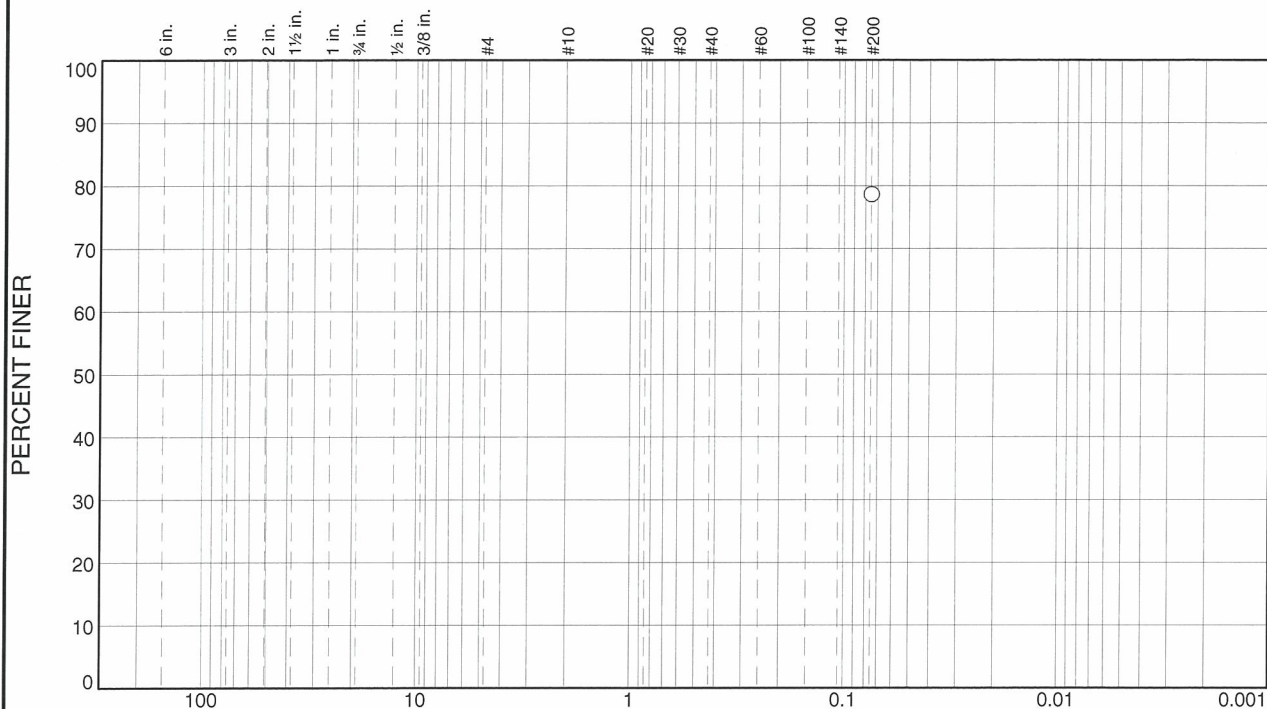
PERCENT FINER vs GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						78.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	78.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S10
Sample Number: S35615   Depth: 25-26.2

Date Sampled:

SIERRA TESTING LABS, INC.
**El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	62.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
D_{90}=　　　　D_{85}=　　　　D_{60}=
D_{50}=　　　　D_{30}=　　　　D_{15}=
D_{10}=　　　　C_u=　　　　C_c=

Remarks

Date Received: 11/16/11　　**Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0013AR, S11
Sample Number: S36275　　**Depth:** 30-31.5

Date Sampled:

SIERRA
TESTING LABS, INC.
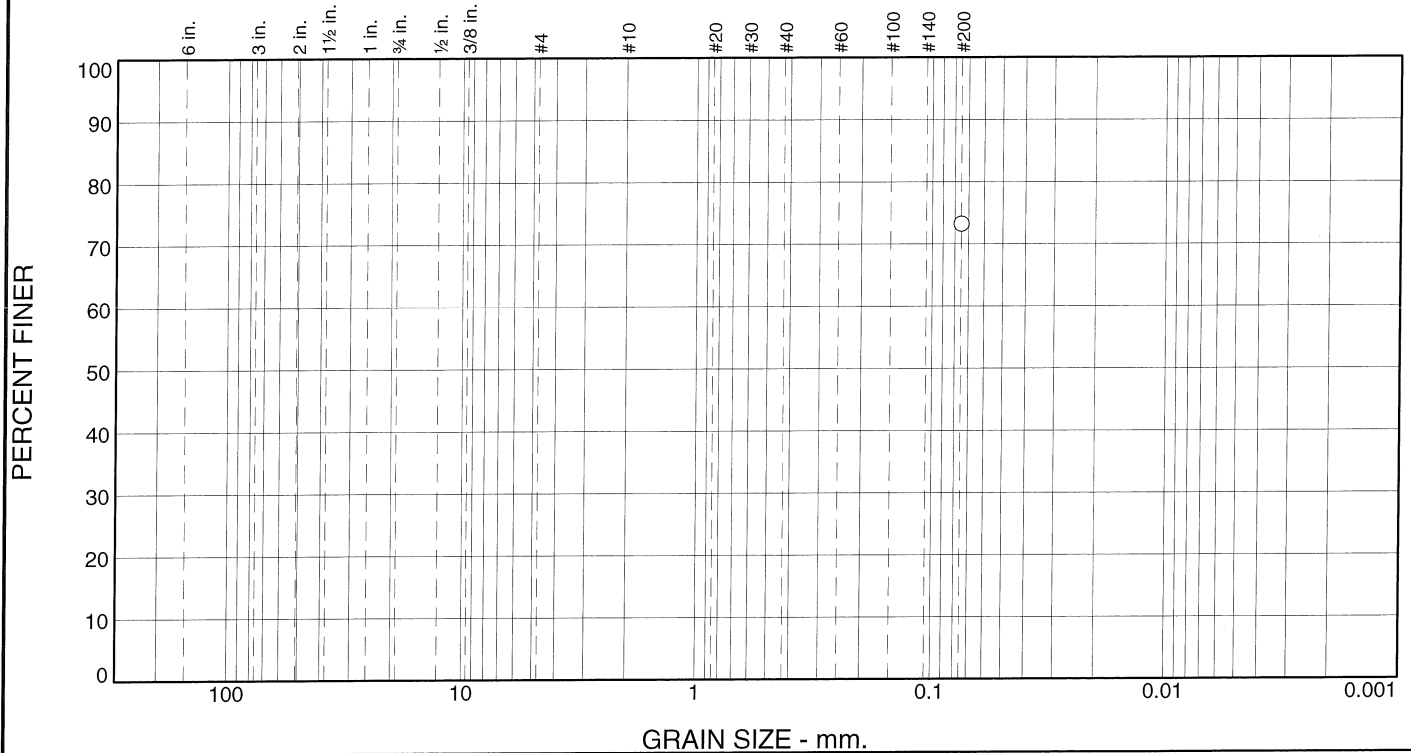## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
　　Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　**Figure**

Particle Size Distribution Report
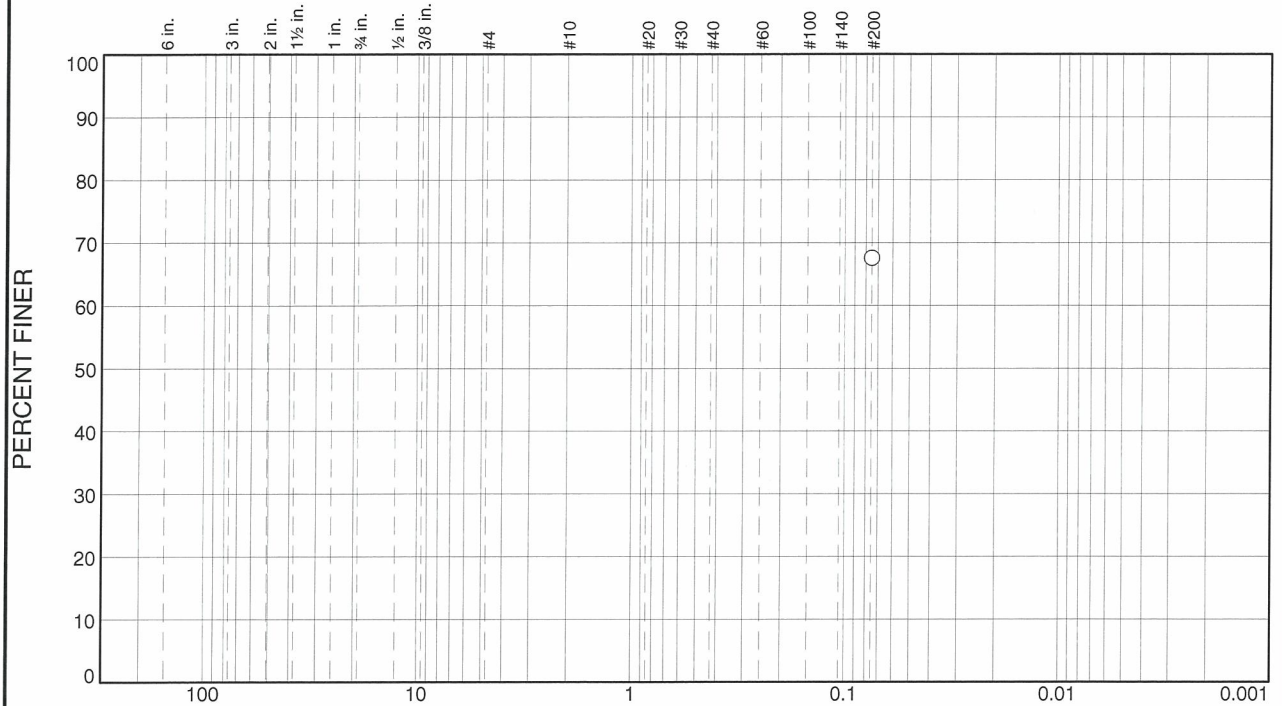
% +3"	% Gravel		% Sand			% Fines	
	Coarse	**Fine**	**Coarse**	**Medium**	**Fine**	**Silt**	**Clay**
						67.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	67.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0013AR, S12
Sample Number: S35616   **Depth:** 35-36.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
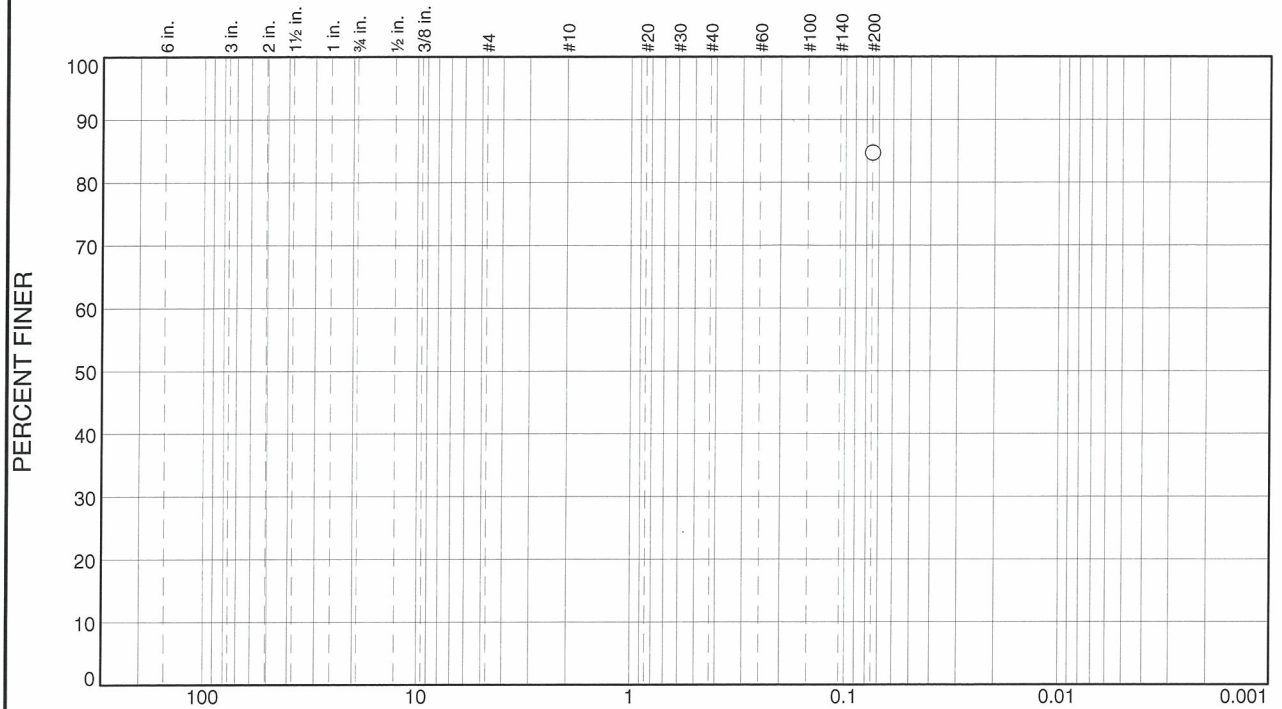
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						84.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	84.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: Date Tested:

Tested By: _____

Checked By: _____

Title: _____

Location: S0013AR, S13
Sample Number: S36276   **Depth:** 40-41.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

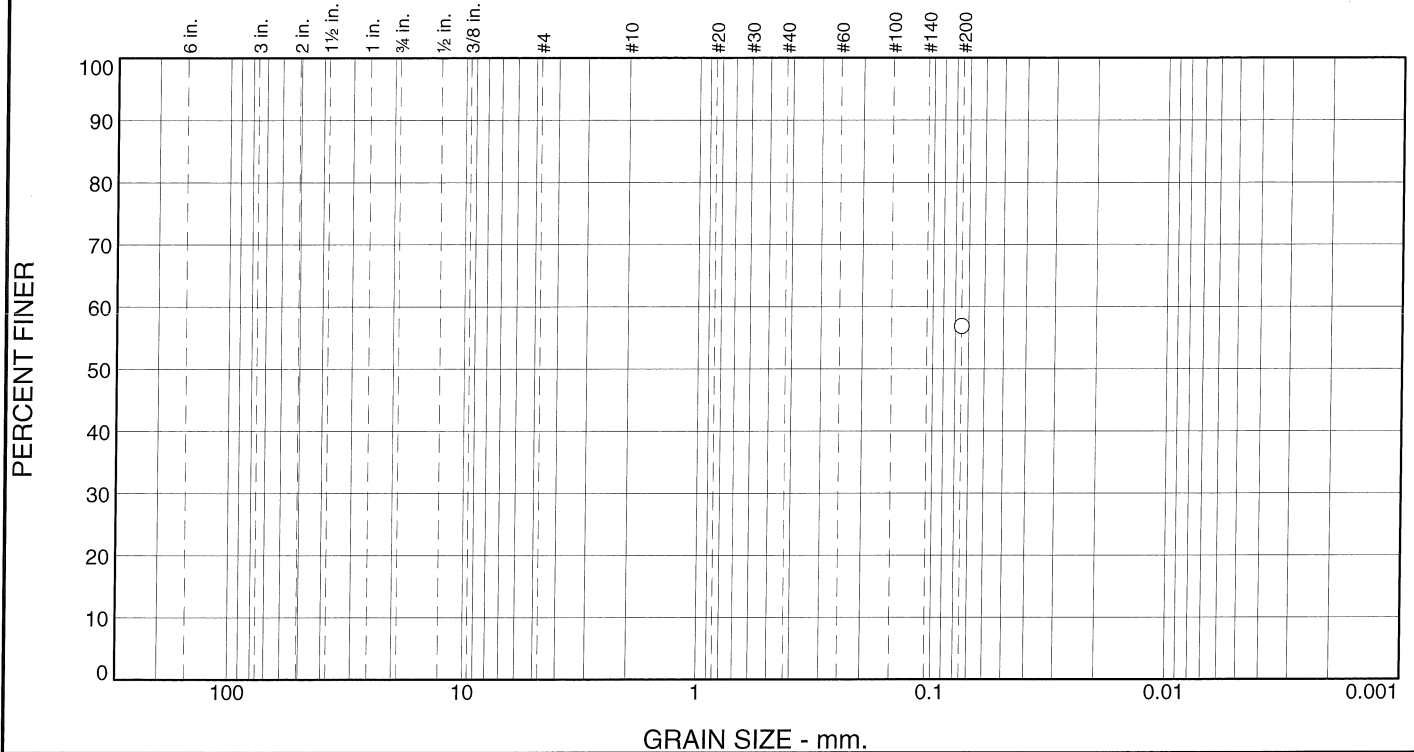**Client:** URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						38.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	38.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S14
**Sample Number:** S35617   **Depth:** 45-45.9

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
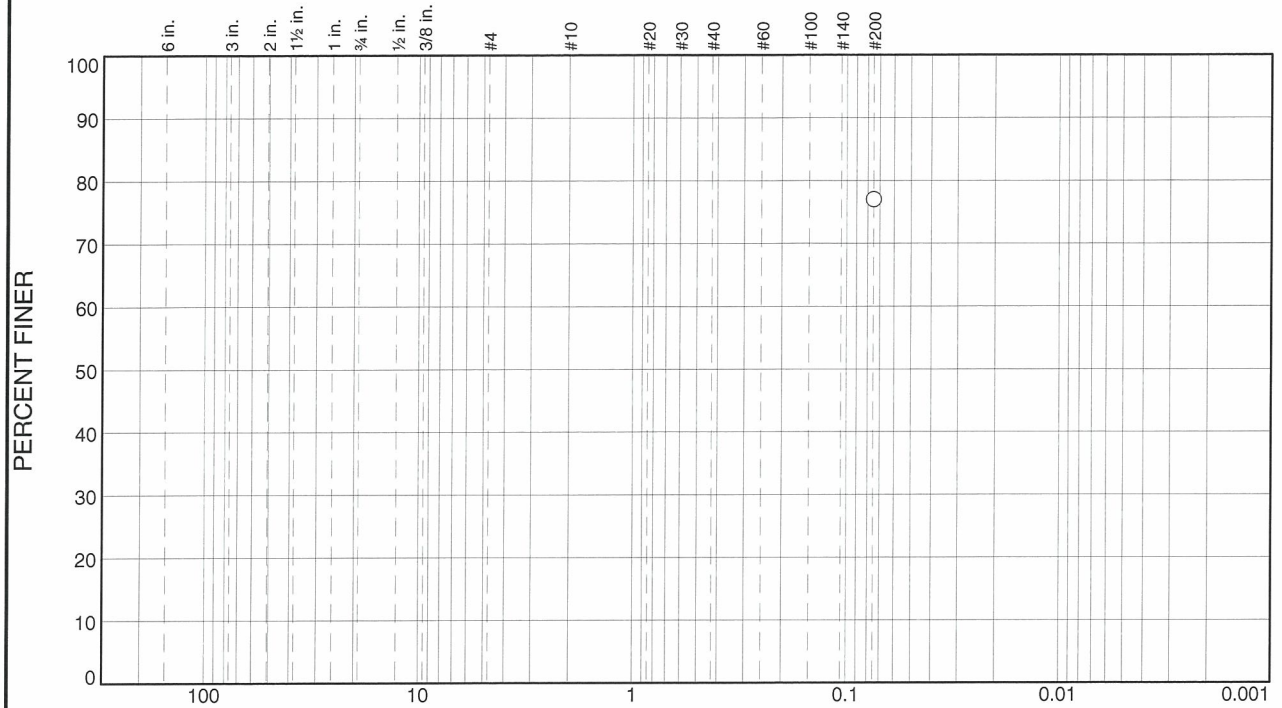
GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	77.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0013AR, S16
Sample Number: S35618   **Depth:** 55-56.2

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
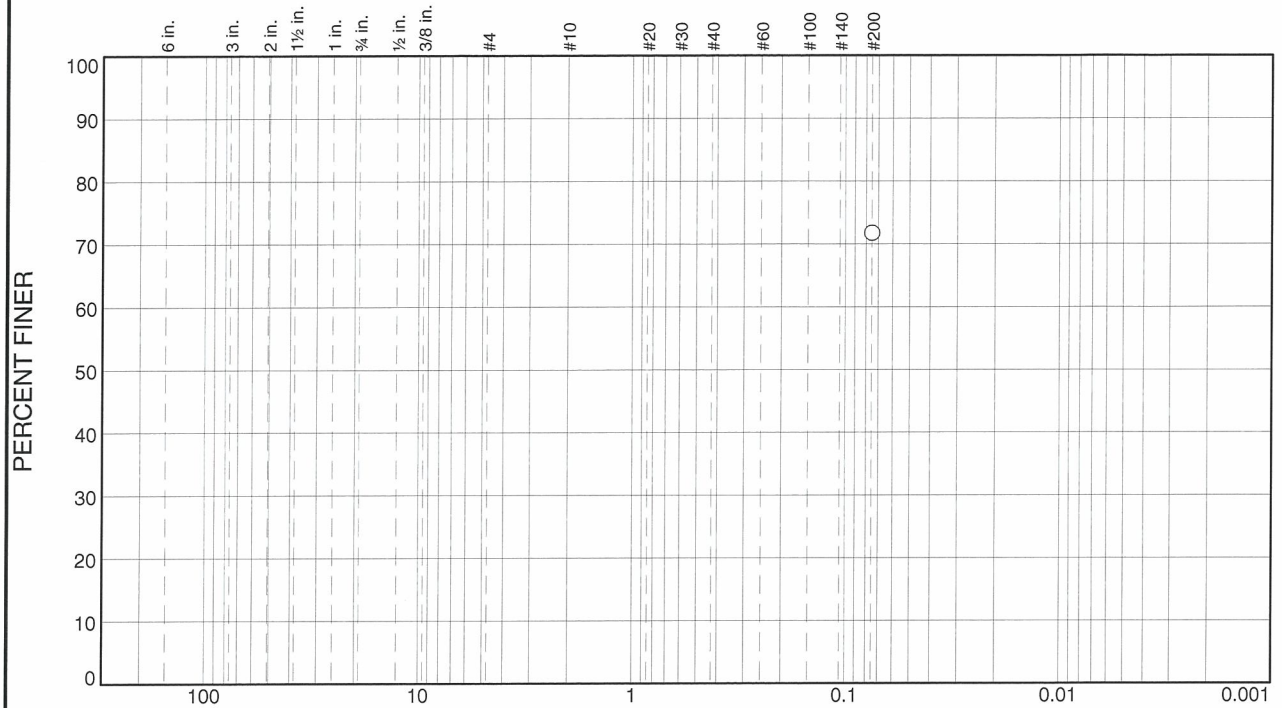
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						71.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	71.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S17
Sample Number: S35619   Depth: 60-61.2

Date Sampled:

**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

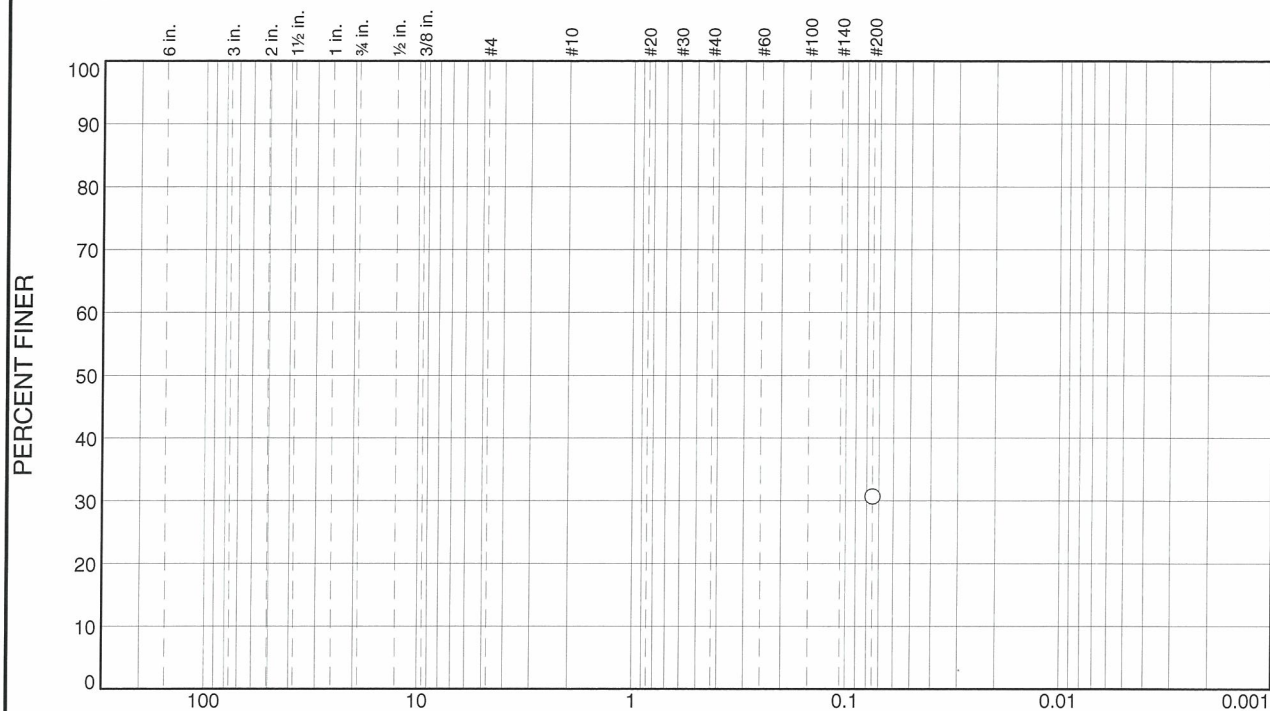Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
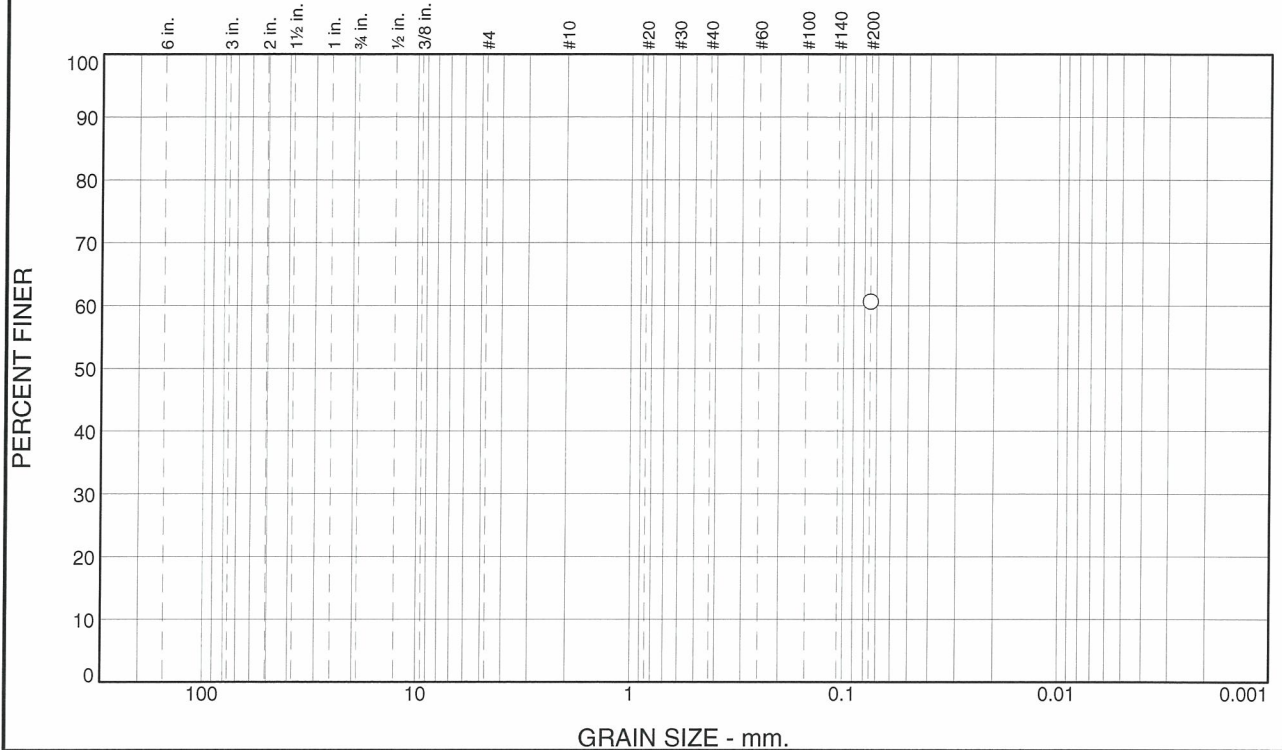
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	60.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S21

Sample Number: S35621   **Depth:** 80-80.9

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						90.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	90.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S24

Sample Number: S35622   **Depth:** 95-95.8

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

PERCENT FINER

Sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	34.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0013AR, S26
Sample Number: S35623   Depth: 105-105.9

Date Sampled:

## SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
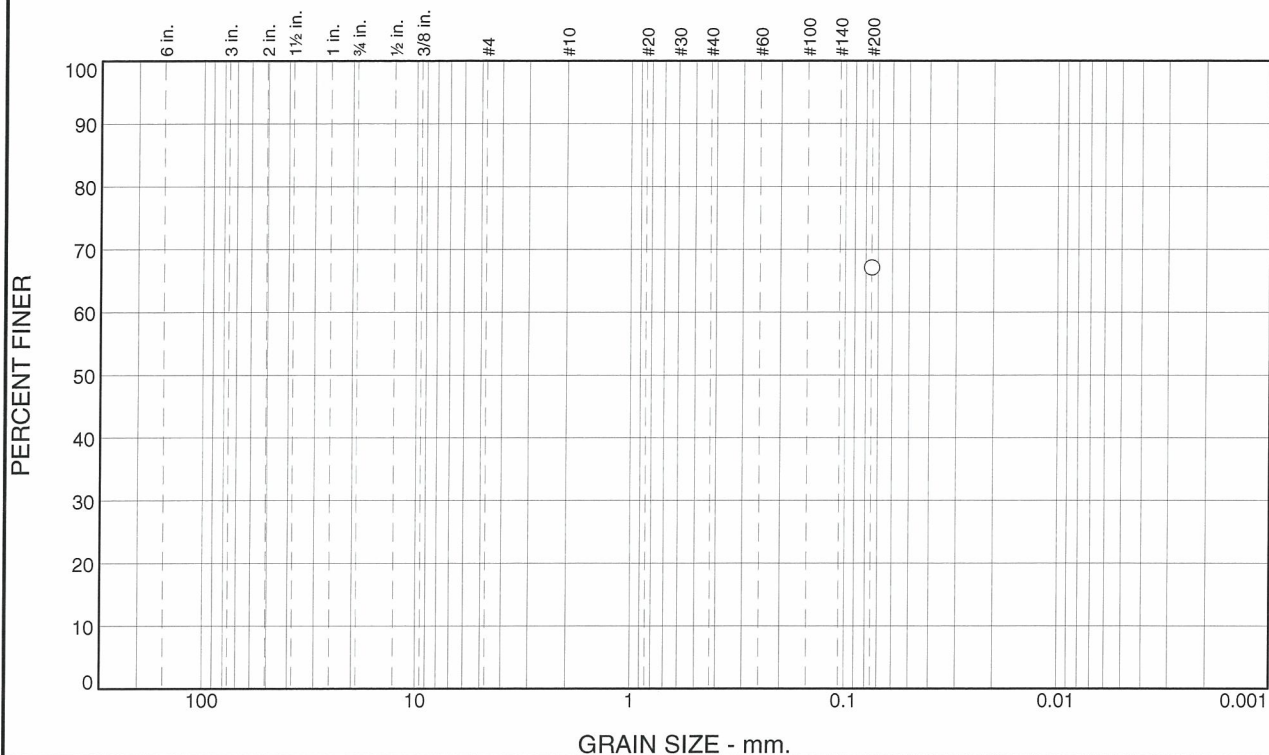
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						67.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	67.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S27

Sample Number: S35624   **Depth:** 110-111.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
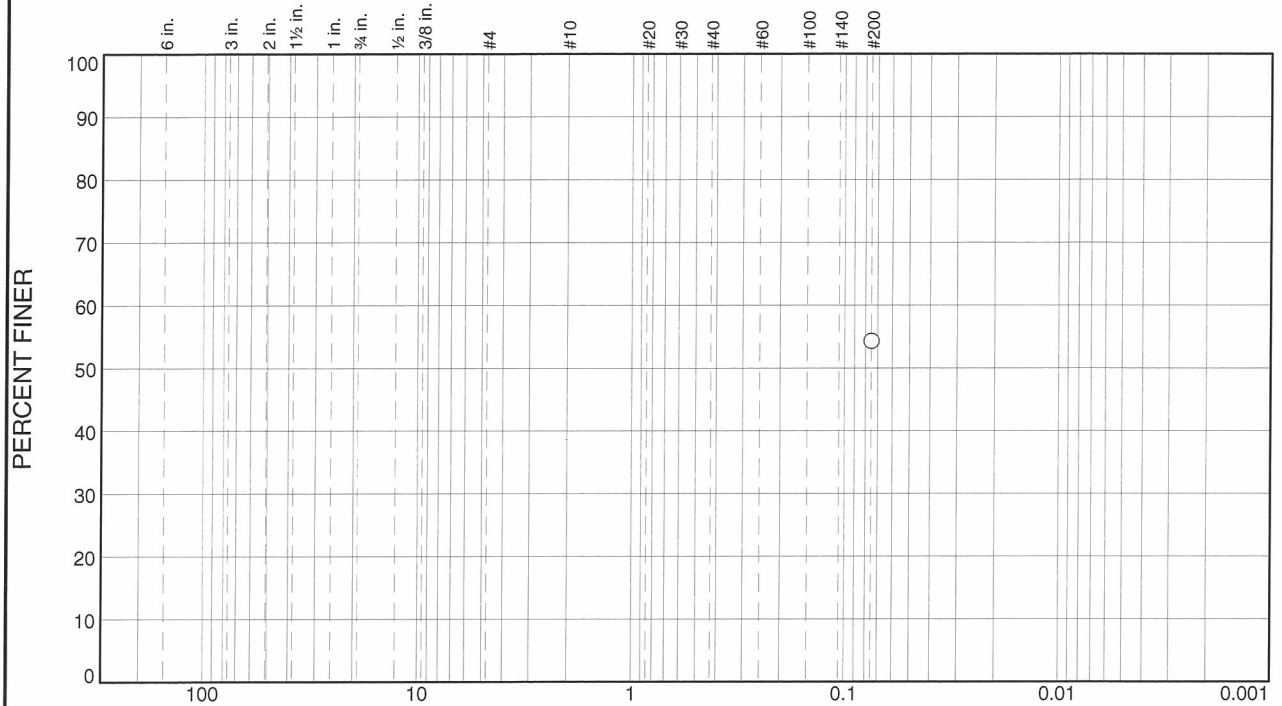
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.3	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	54.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　LL=　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
D_{90}=　　　　D_{85}=　　　　D_{60}=
D_{50}=　　　　D_{30}=　　　　D_{15}=
D_{10}=　　　　C_u=　　　　C_c=

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0013AR, S28
Sample Number: S35625　　　Depth: 115-115.9

Date Sampled:

SIERRA
TESTING LABS, INC.
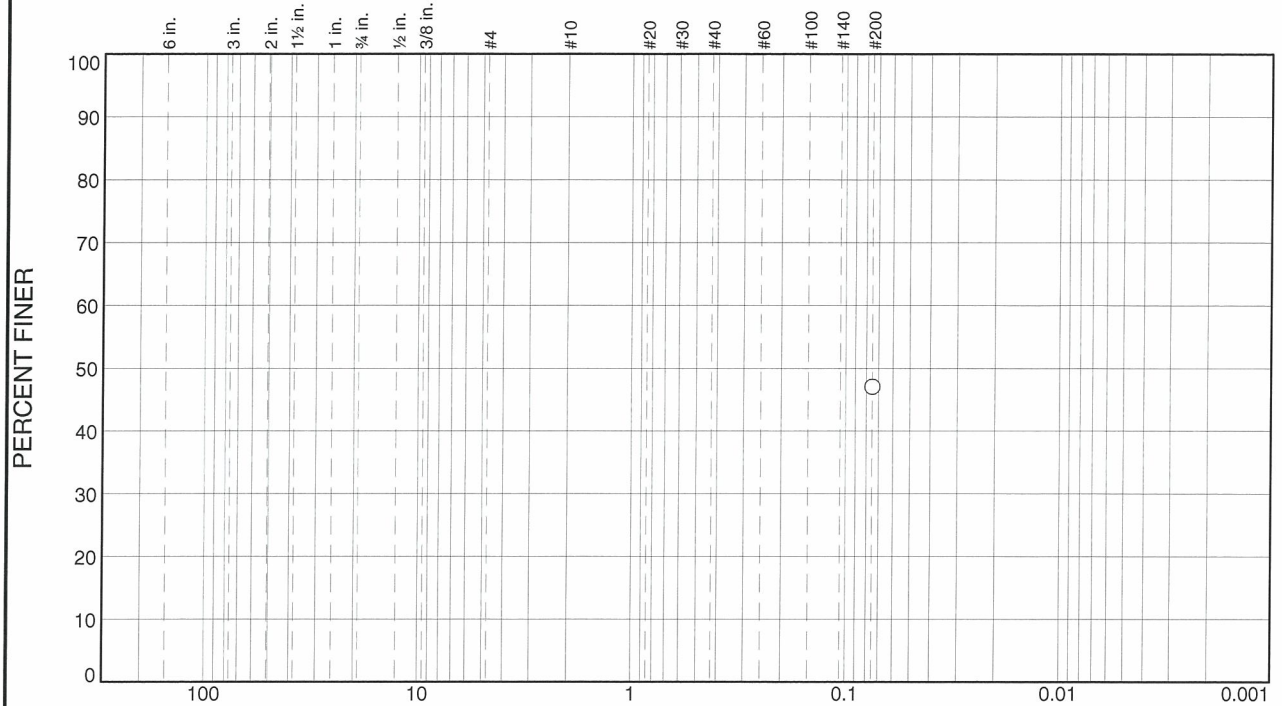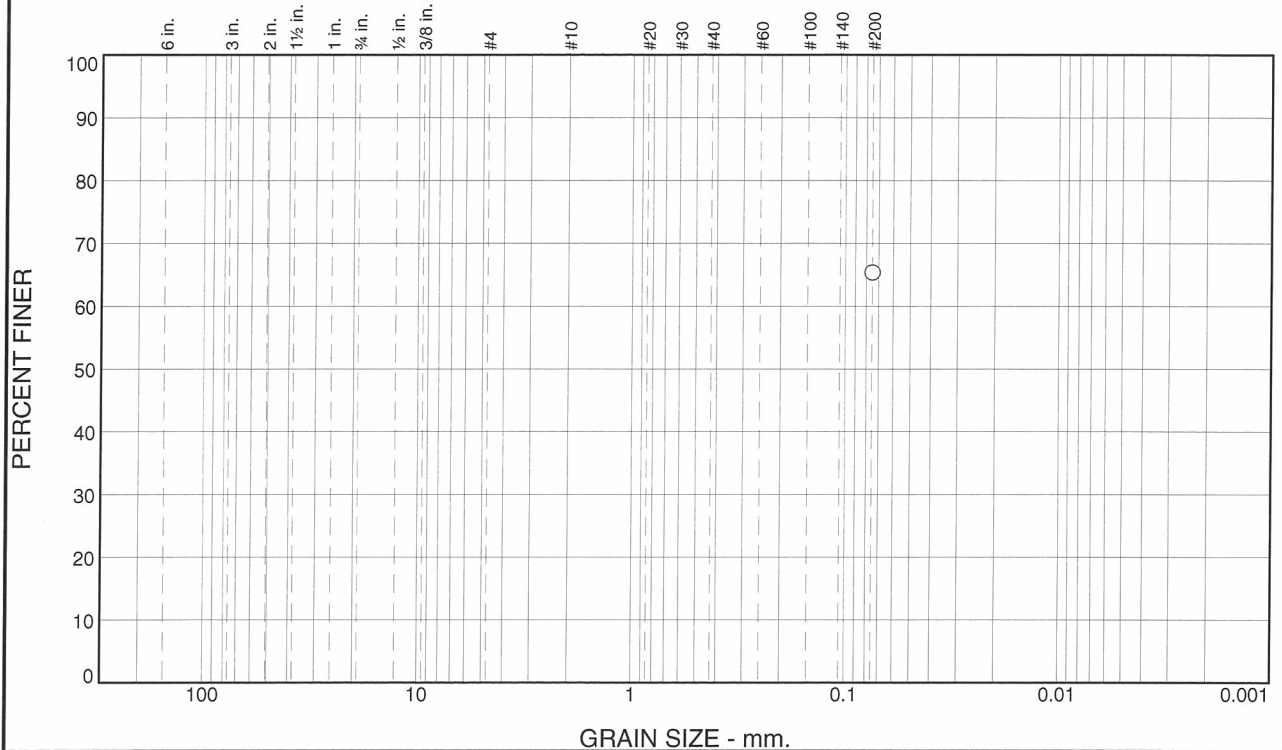## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　Figure

Particle Size Distribution Report
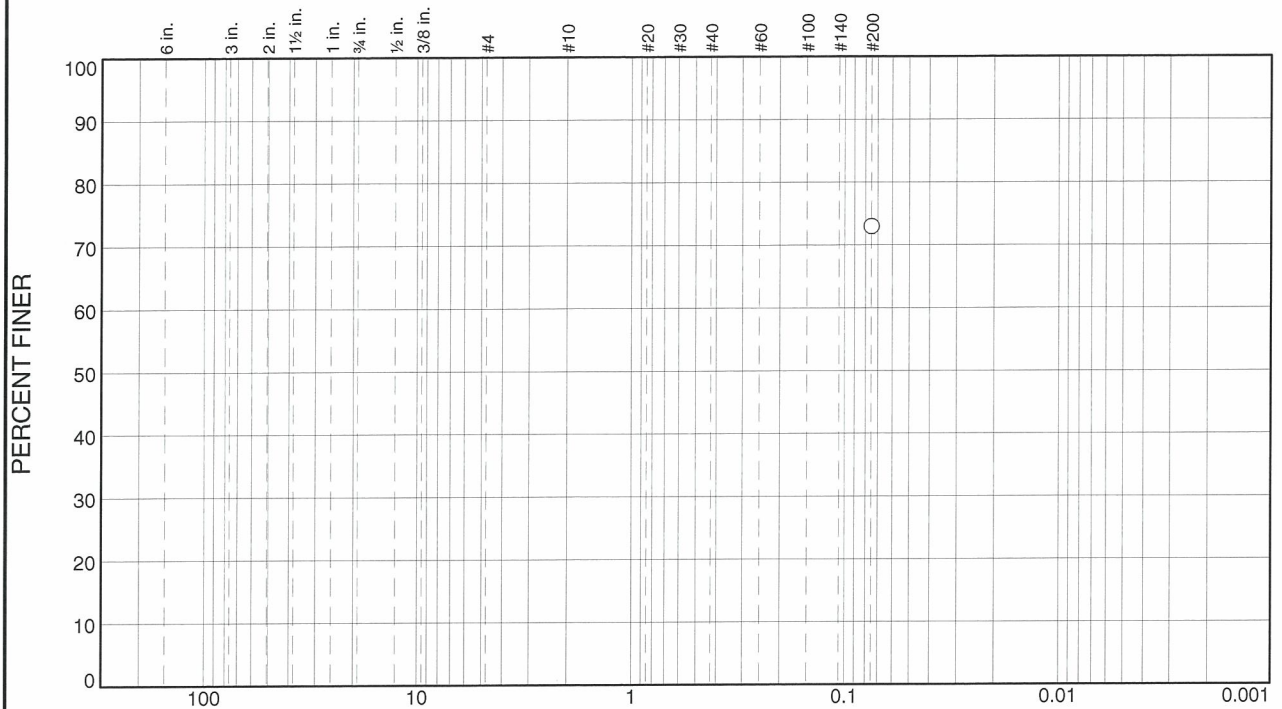
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0013AR, S30   Date Sampled:
Sample Number: S35626   Depth: 125-126.1

SIERRA TESTING LABS, INC. El Dorado Hills, CA
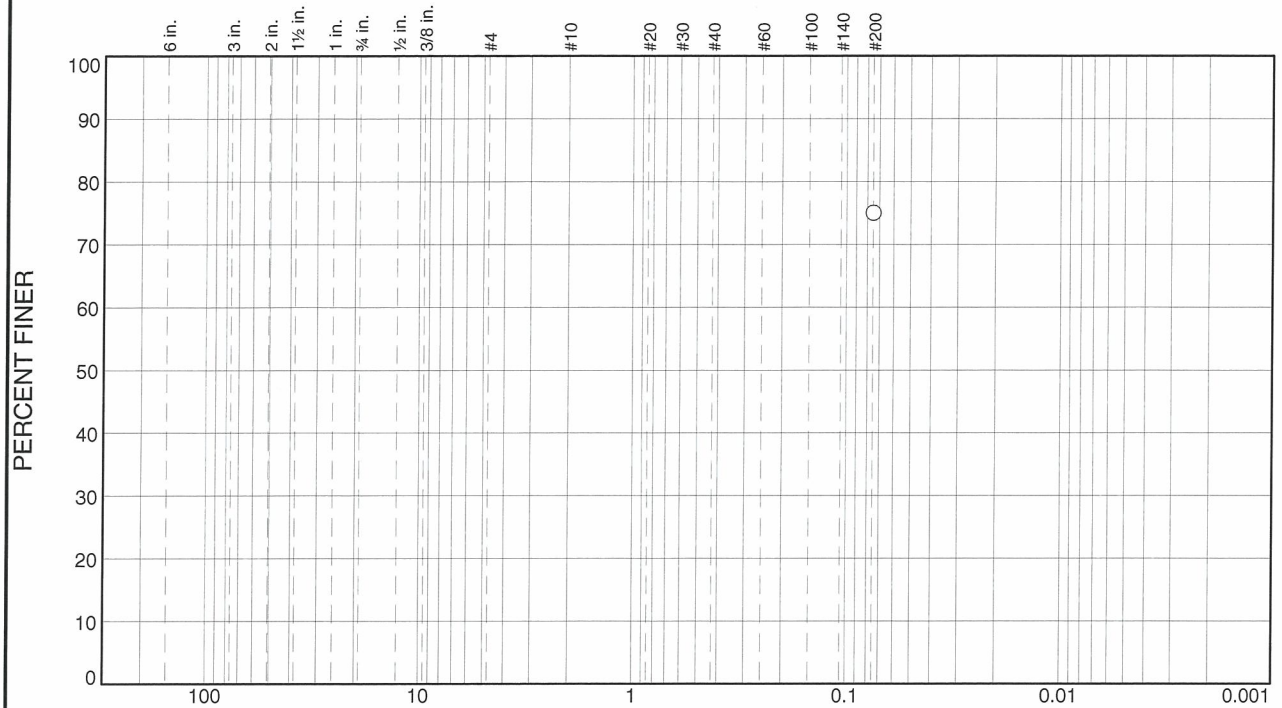
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
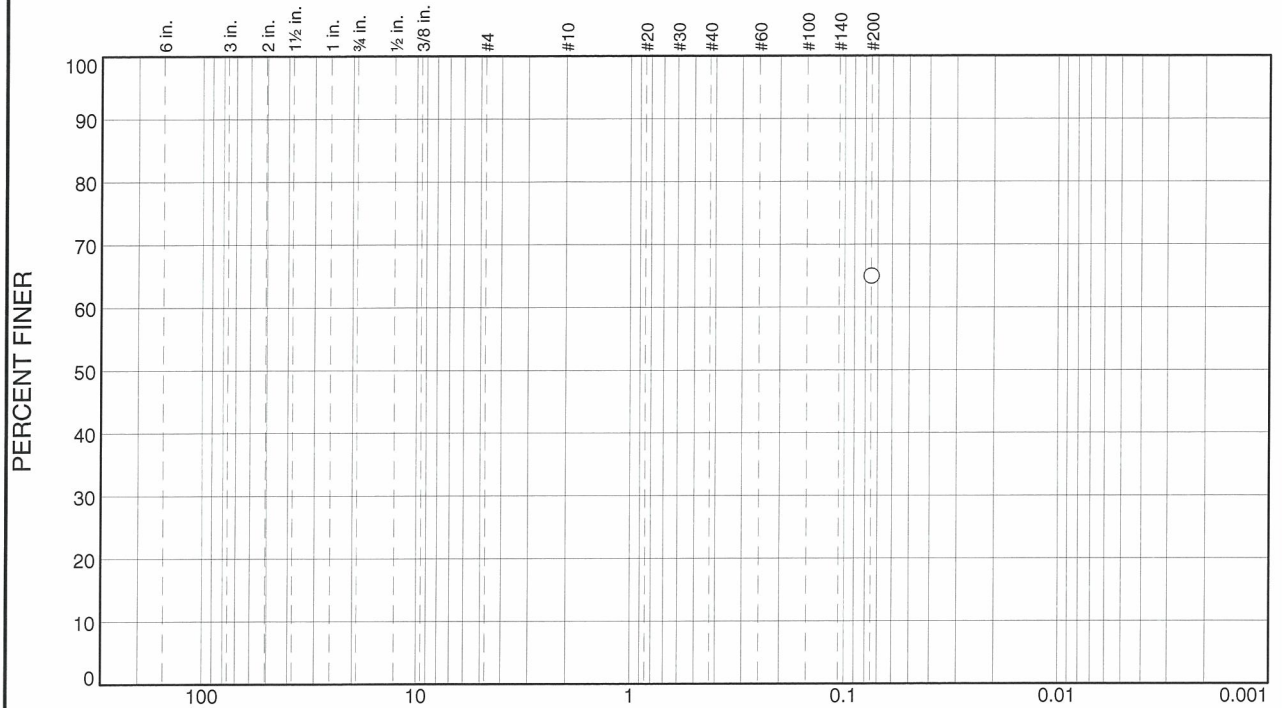
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.0		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0013AR, S32

Sample Number: S35627   **Depth:** 135-136.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
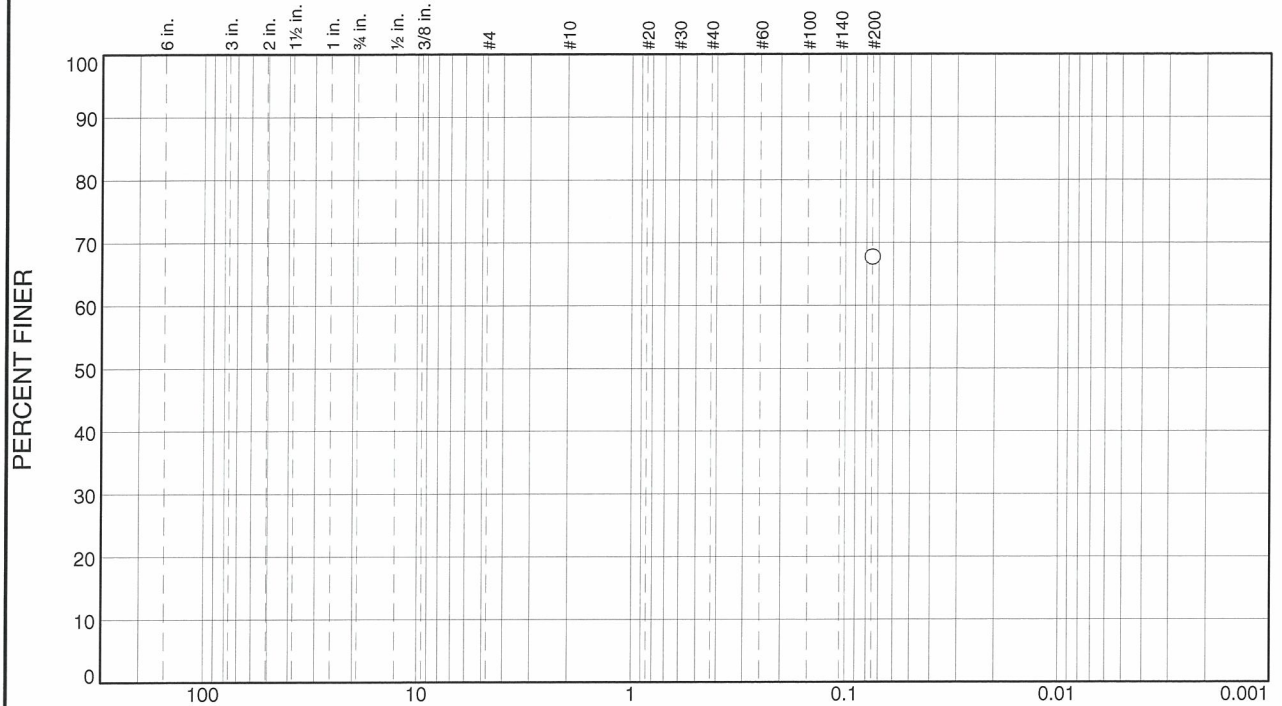
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						67.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	67.7		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014AR, S01
Sample Number: S36282   Depth: 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
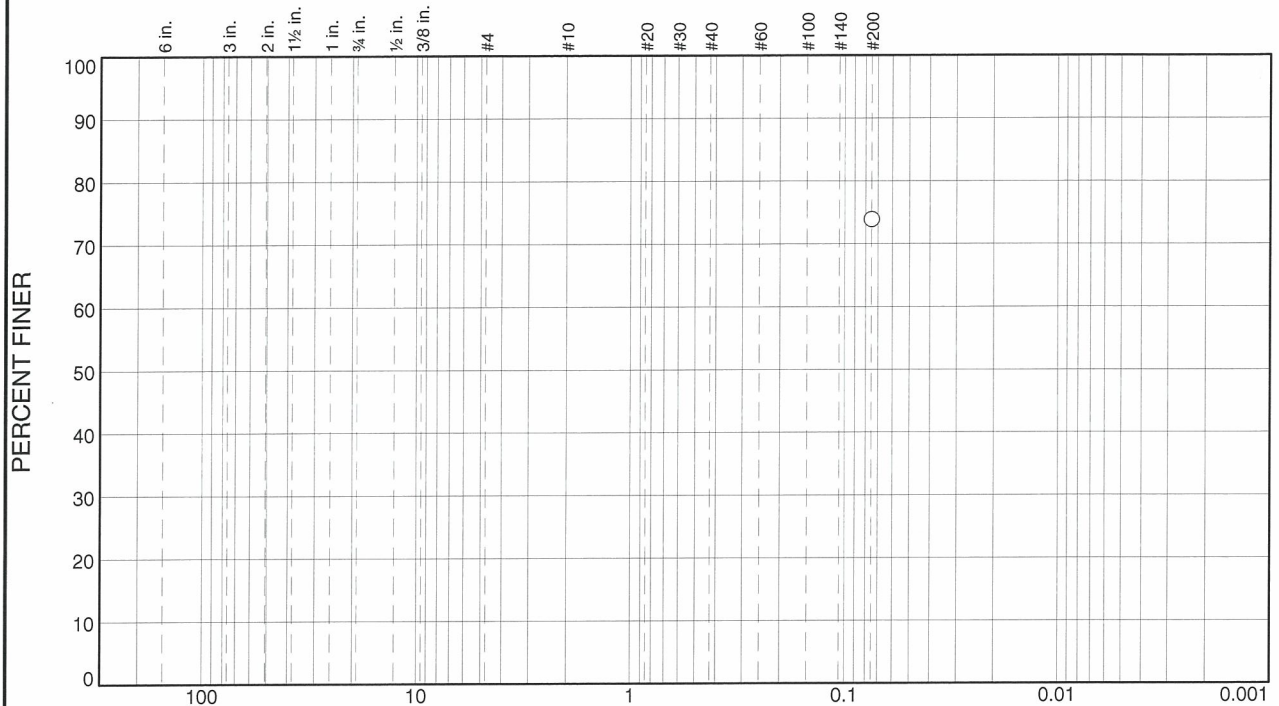## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
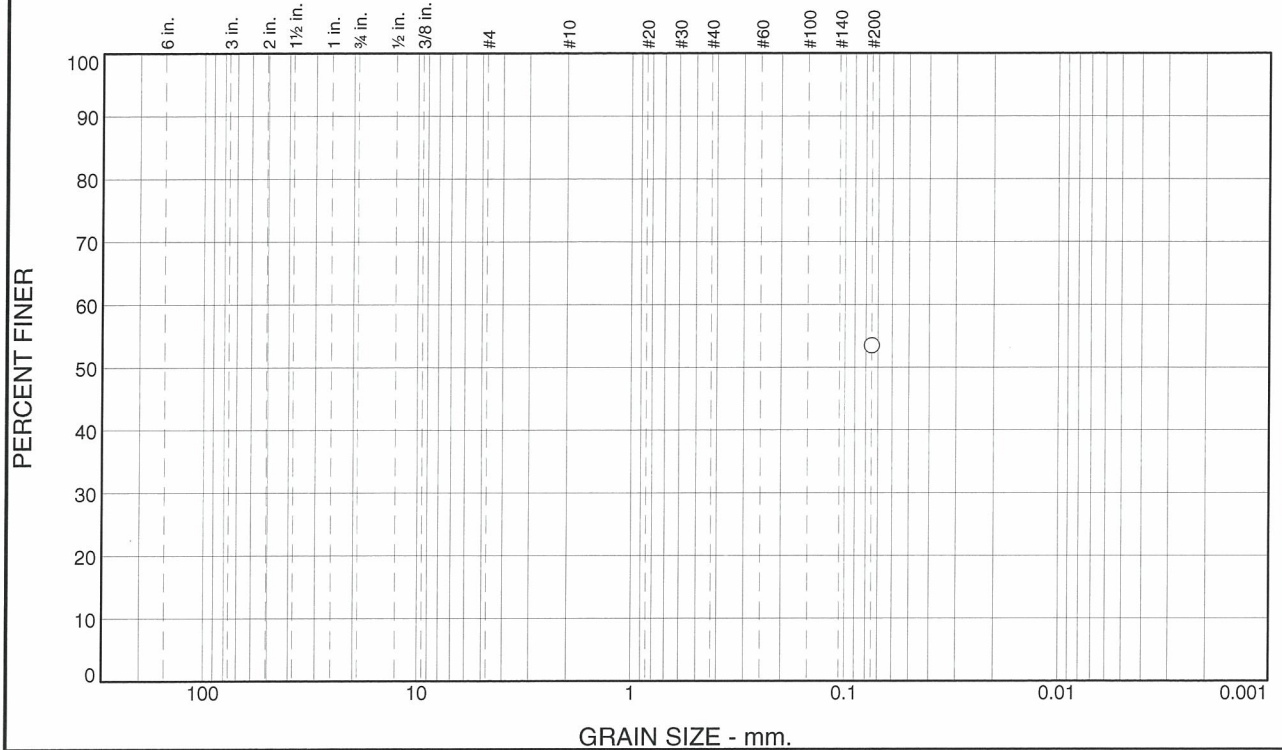
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: pm

Location: S0014AR, S02

Sample Number: S35640   Depth: 5-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
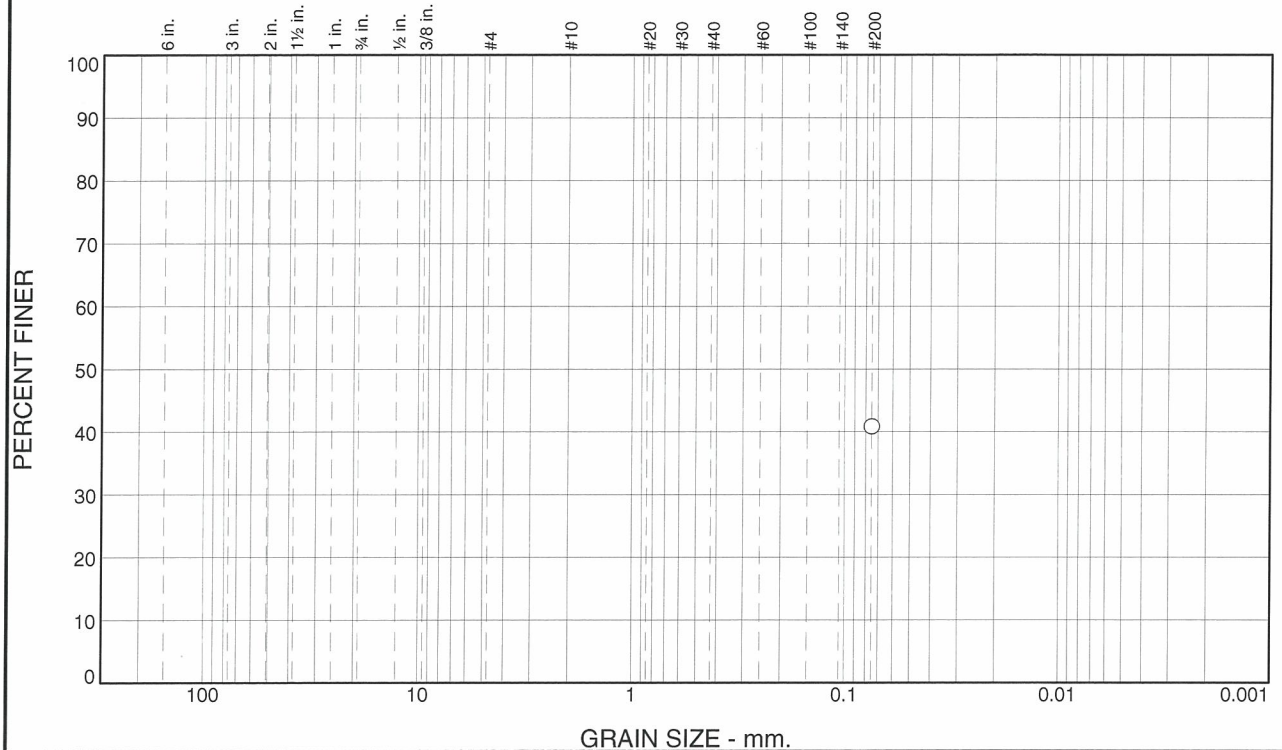
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.9	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	40.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014AR, S03
Sample Number: S36283   **Depth:** 6.5-7.8

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
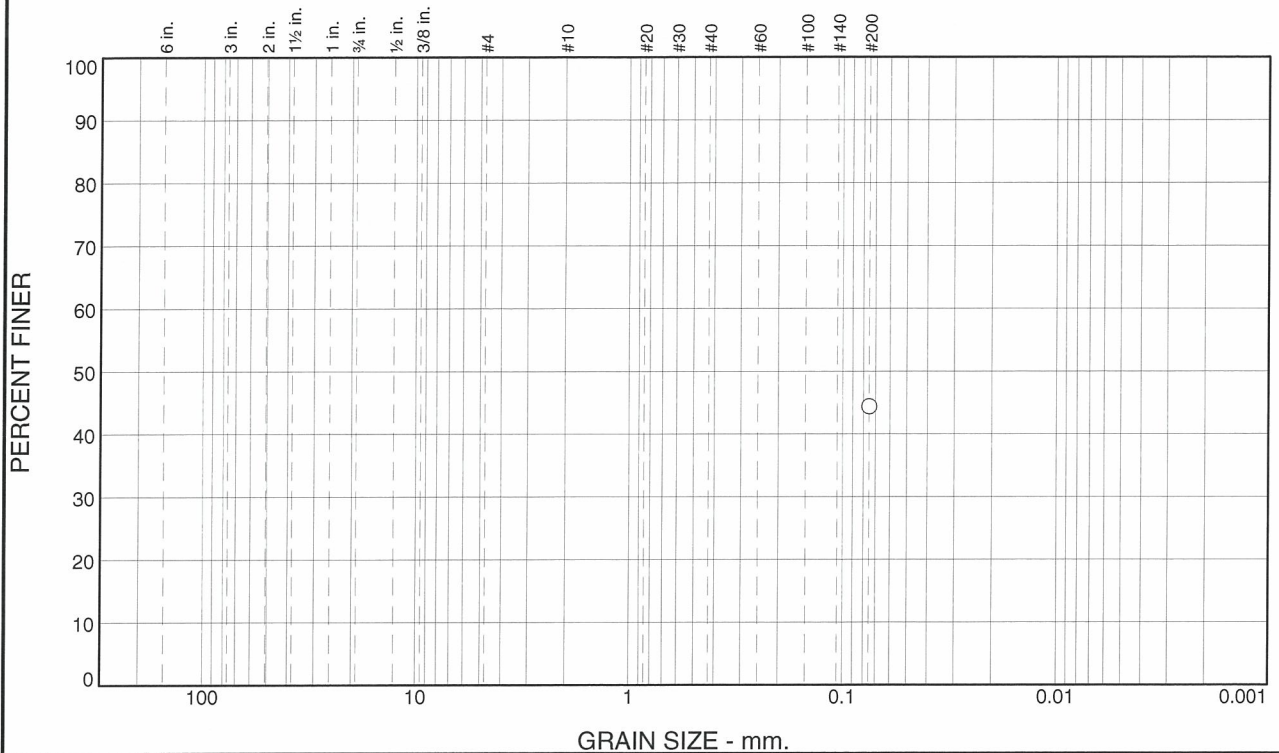
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	44.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014AR, S04
Sample Number: S35641   Depth: 8-9.2

Date Sampled:

**SIERRA
TESTING LABS, INC.
El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve labels (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0014AR, S05
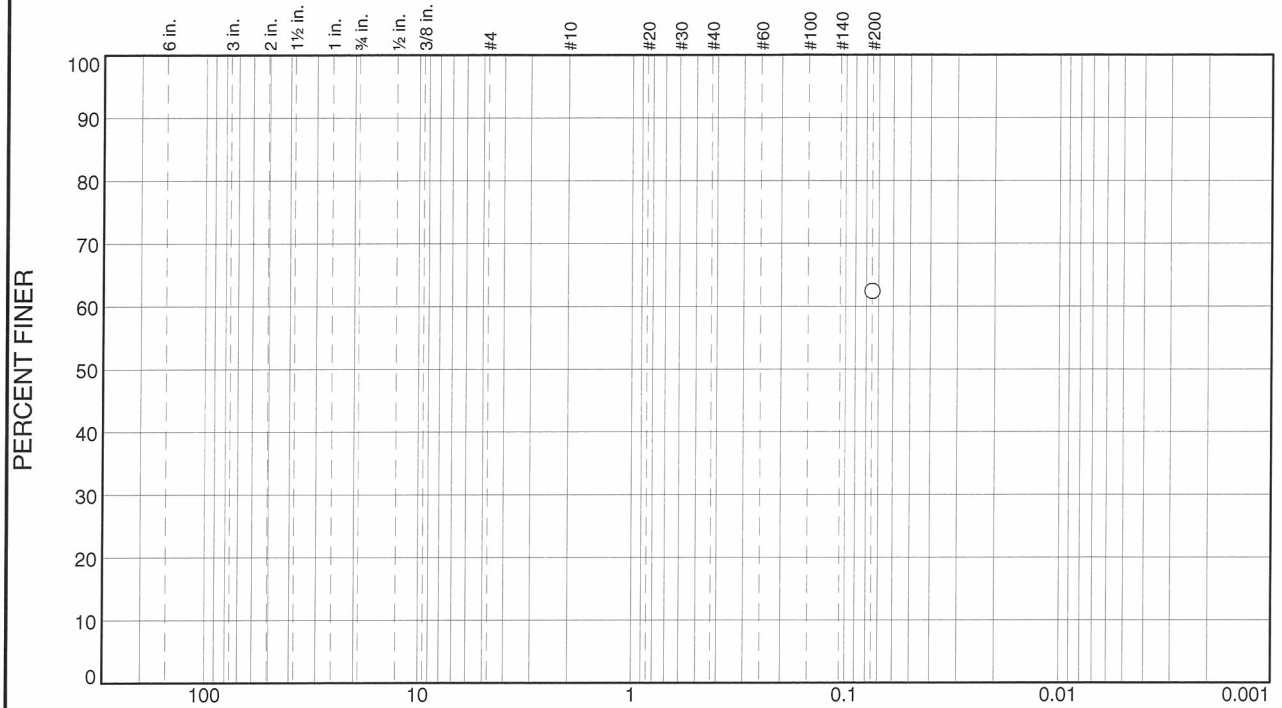Sample Number: S35642   Depth: 9.5-11.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
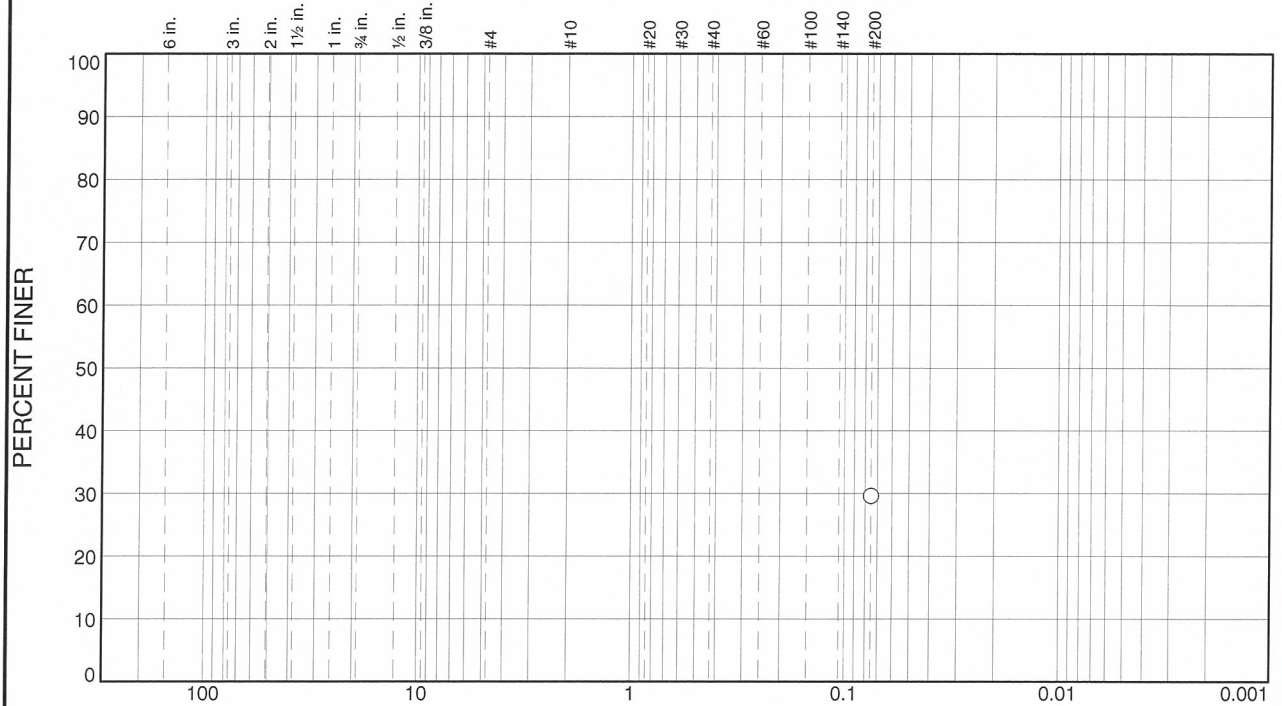
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						29.7	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	29.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: CW

Title: PM

Location: S0014AR, S06
Sample Number: S35643   Depth: 11-12.2

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
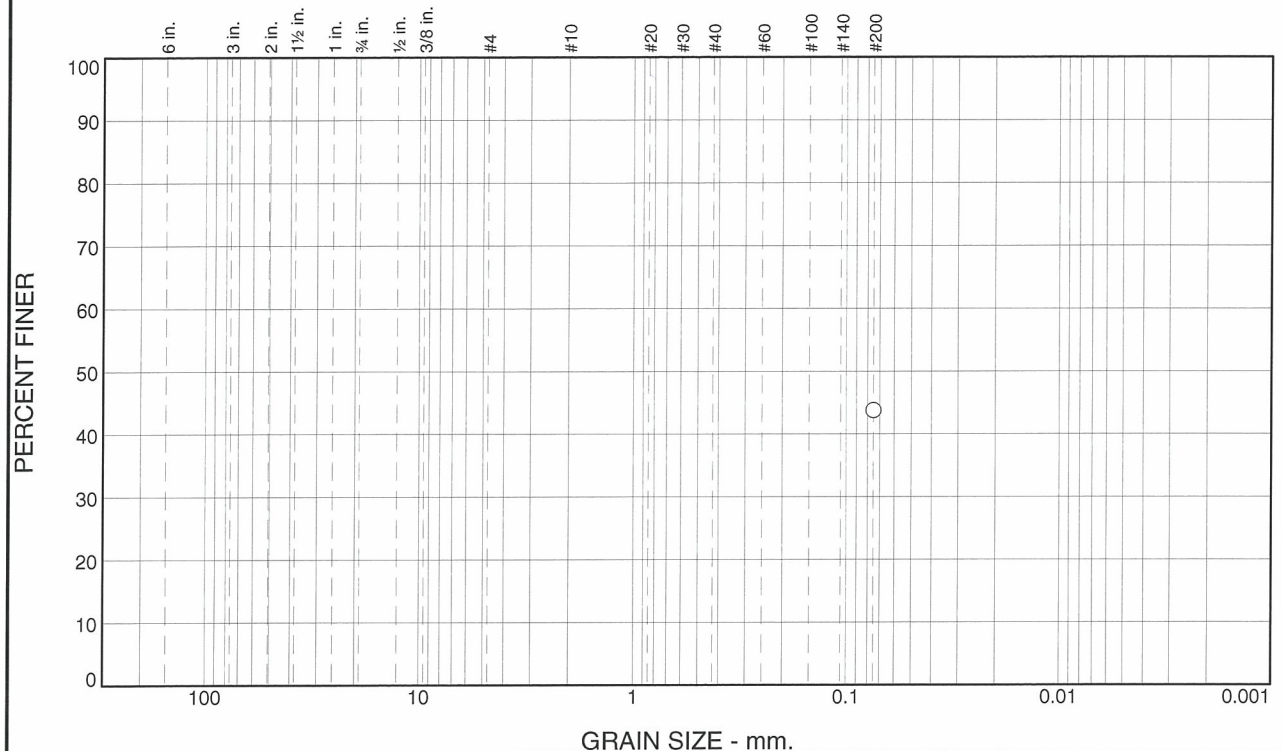
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						43.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	43.8		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0014AR, S09

Sample Number: S36284   Depth: 20-21.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
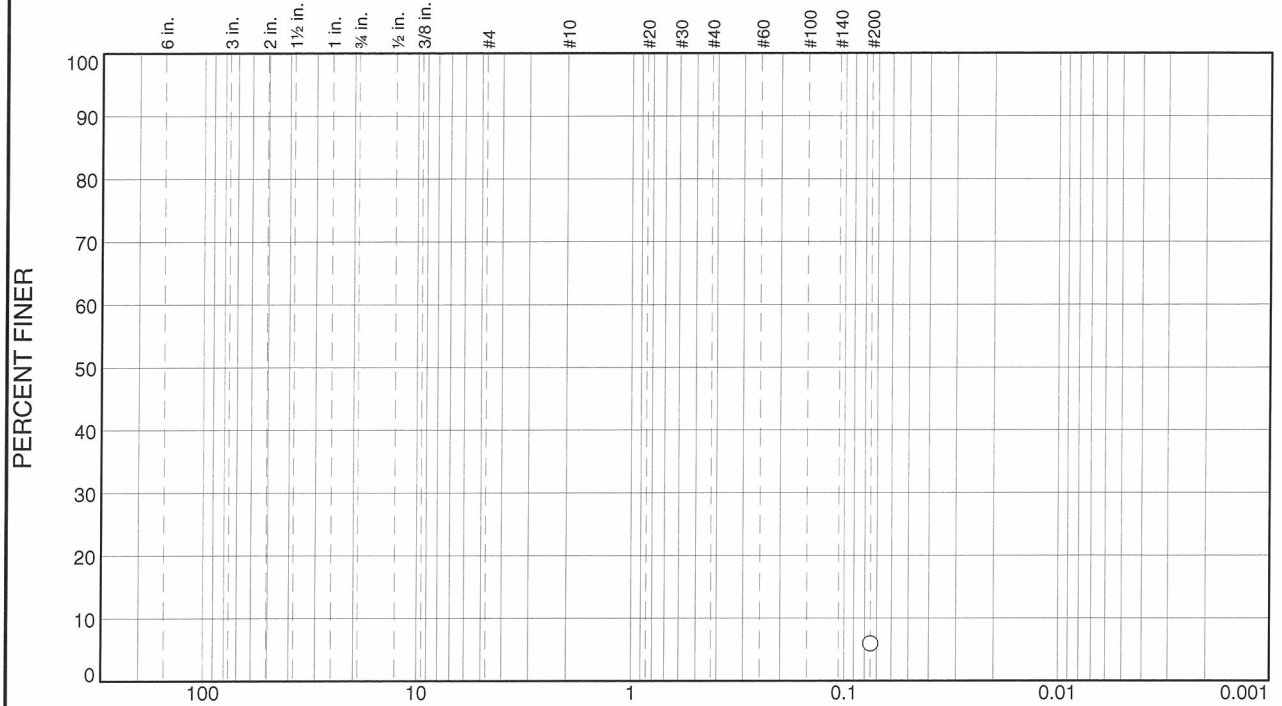
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	6.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D$_{90}$=   D$_{85}$=   D$_{60}$=
D$_{50}$=   D$_{30}$=   D$_{15}$=
D$_{10}$=   C$_u$=   C$_c$=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0014AR, S11
Sample Number: S36285   Depth: 30-31.2
Date Sampled:

**SIERRA TESTING LABS, INC.
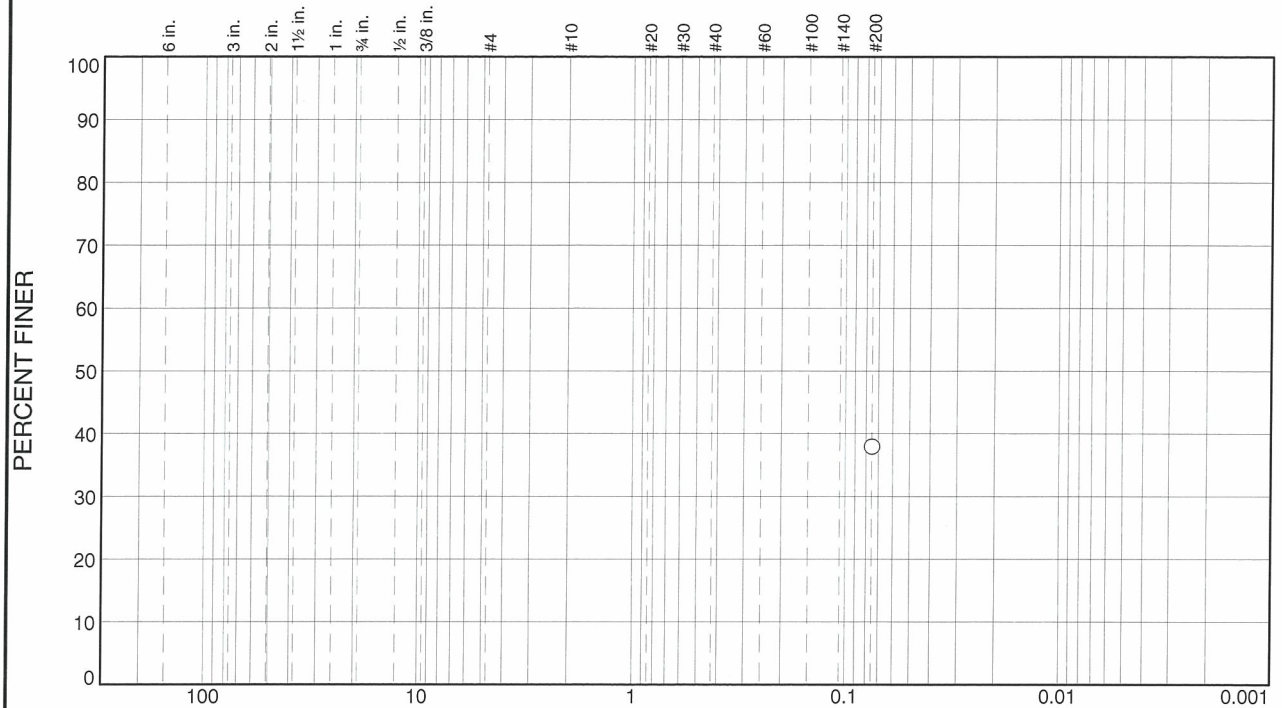El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						33.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	33.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014AR, S12
Sample Number: S35647   **Depth:** 35-36.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

Grain size chart with sieve sizes labeled: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200. Y-axis PERCENT FINER from 0 to 100. X-axis GRAIN SIZE - mm from 100 to 0.001. One data point plotted at approximately 60.8% finer near #200.

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	60.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 11   LL= 30   PI= 19

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0014AR, S13
Sample Number: S35648   **Depth:** 40-41.4

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						42.1	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	42.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Date Sampled:

Location: S0014AR, S15
Sample Number: S35650   Depth: 50-51.4

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
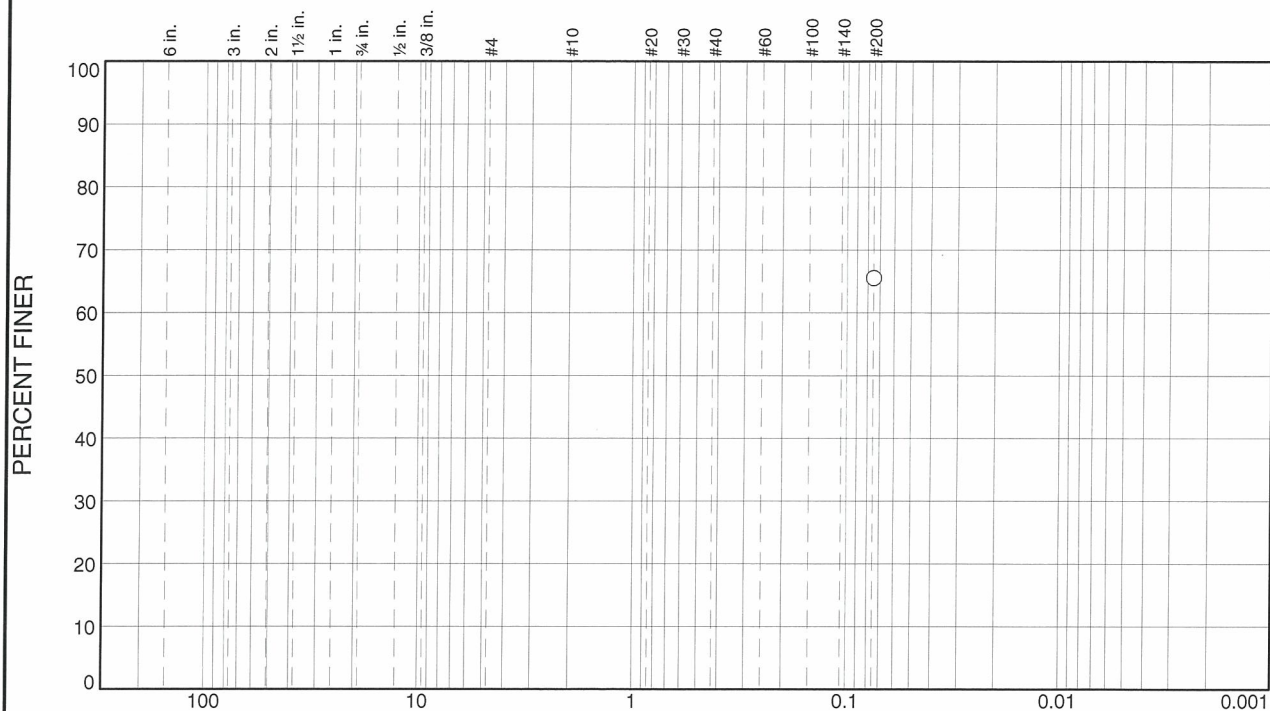
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						65.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	65.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

Location: S0014AR, S17
Sample Number: S35651   Depth: 60-61.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
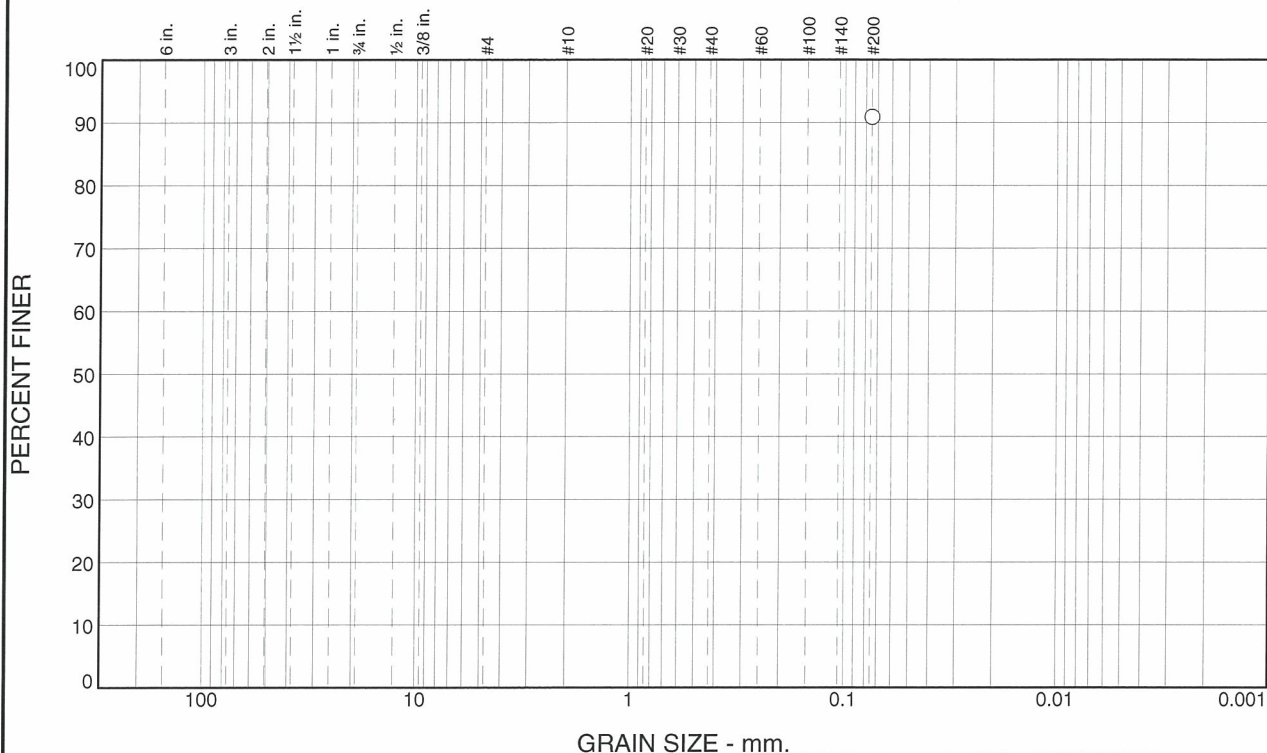
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER (y-axis: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

Sieve markings (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	37.1		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

* (no specification provided)

Location: S0014AR, S18
Sample Number: S35652   **Depth:** 65-66.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						49.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	49.8		

* (no specification provided)

Location: S0014AR, S19
Sample Number: S35653   **Depth:** 70-71.4

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
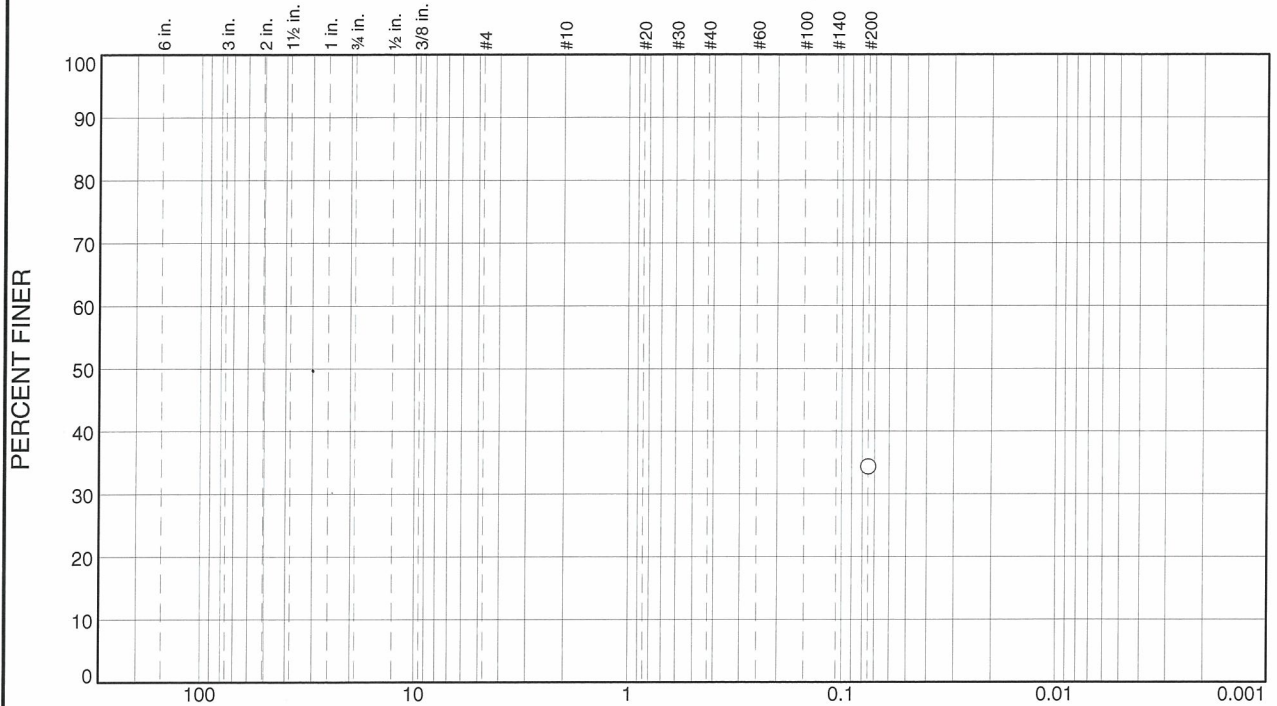**Tested By:** AC
Checked By: CW
Title: PM

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014AR, S20

Sample Number: S35654   Depth: 75-76.5

Date Sampled:

SIERRA TESTING LABS, INC.
### El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014R, S01
Sample Number: S36277   **Depth:** 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						17.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	17.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014R, S02
Sample Number: S36278   Depth: 5-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER (y-axis): 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

Top sieve labels: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

GRAIN SIZE - mm. (x-axis): 100, 10, 1, 0.1, 0.01, 0.001

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						21.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	21.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014R, S03

Sample Number: S36279   **Depth:** 6.5-7.8

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
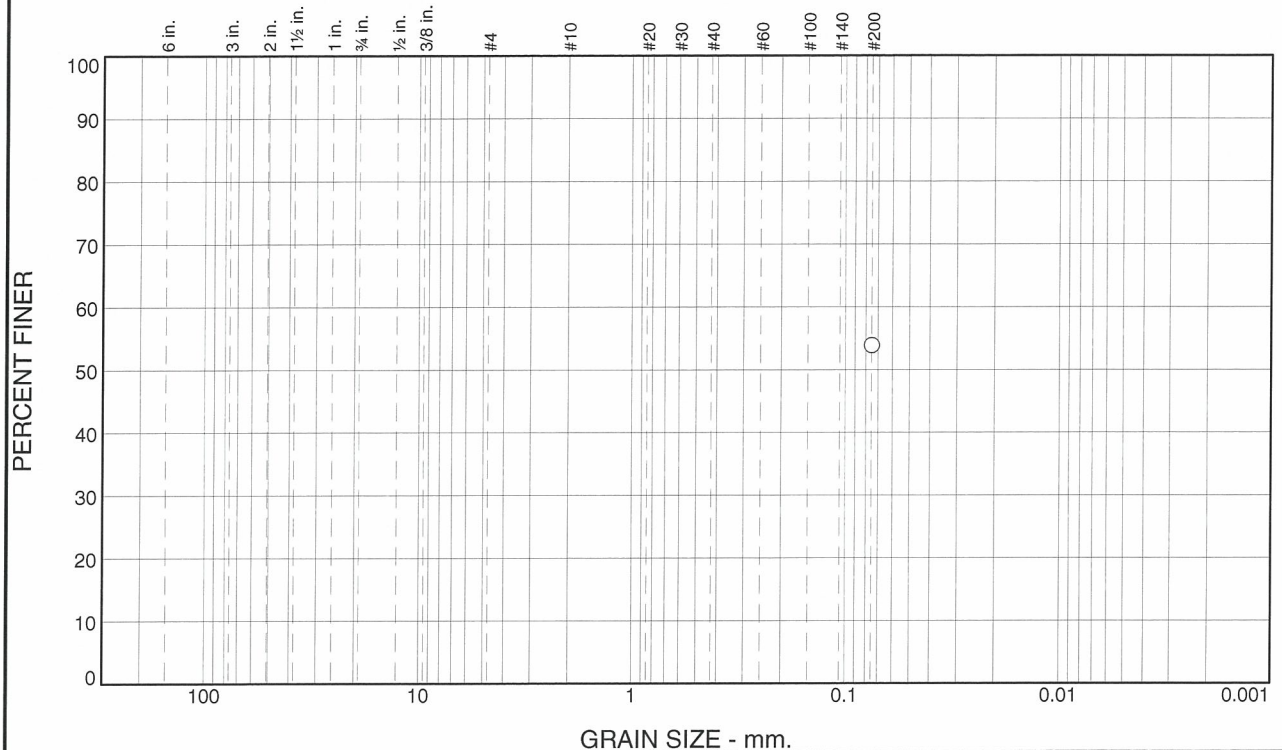
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S04
Sample Number: S35628   Depth: 8-9.3

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
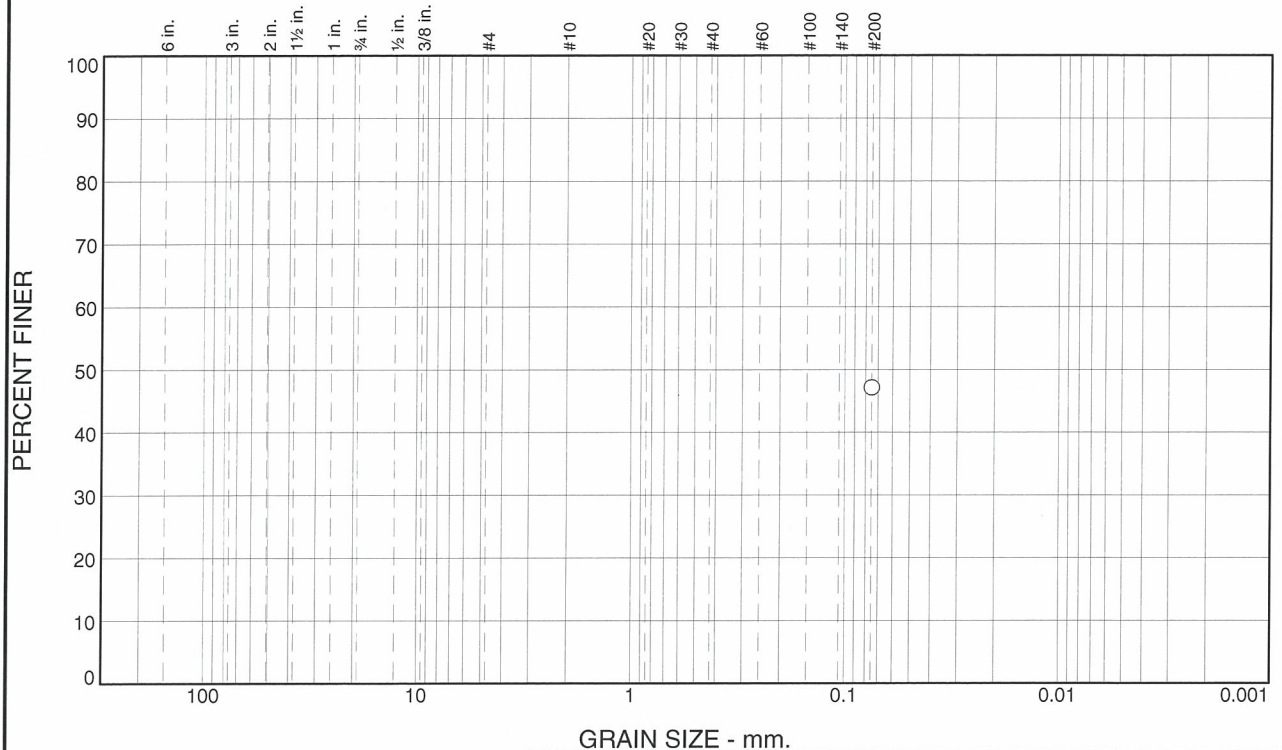
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						47.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	47.2		

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: AC

Checked By: CW

Title: PM

* (no specification provided)

Location: S0014R, S05
Sample Number: S35629   **Depth:** 9.5-10.7

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report
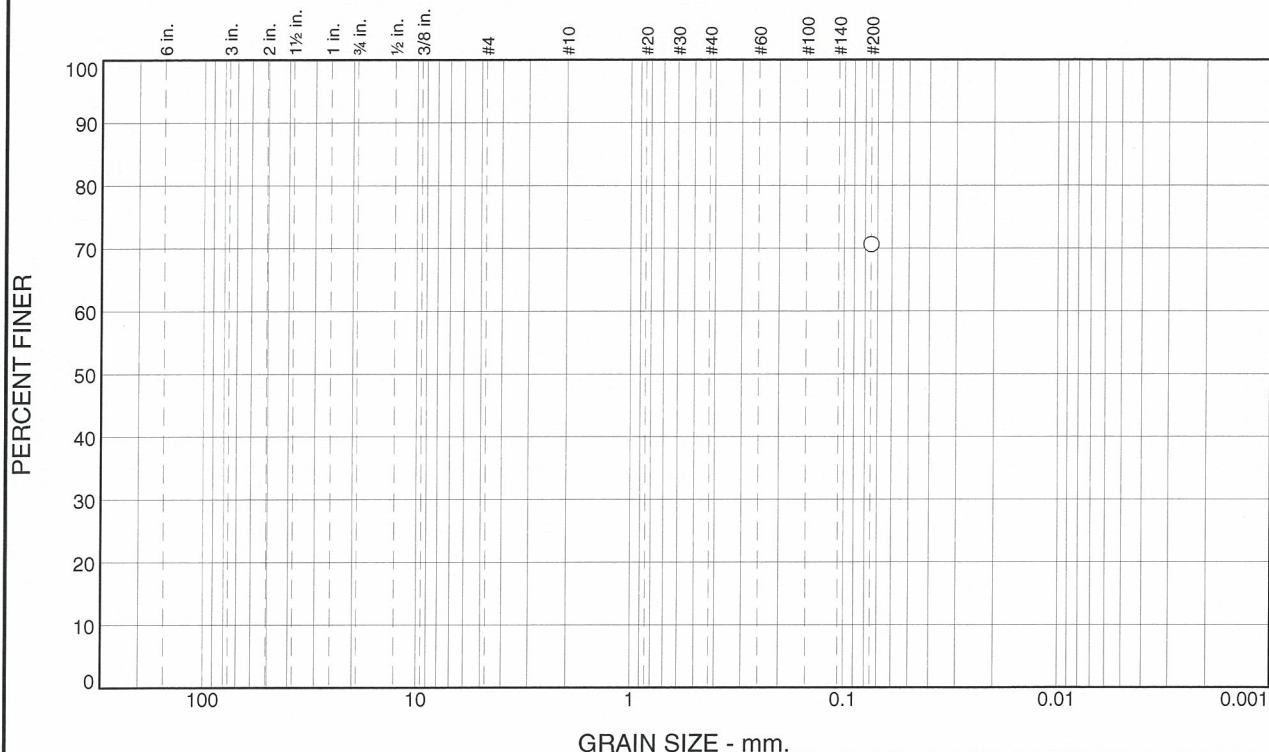
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						70.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	70.6		

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

* (no specification provided)

Location: S0014R, S06
Sample Number: S35630　　　**Depth:** 11-12.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
　　　Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　**Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.
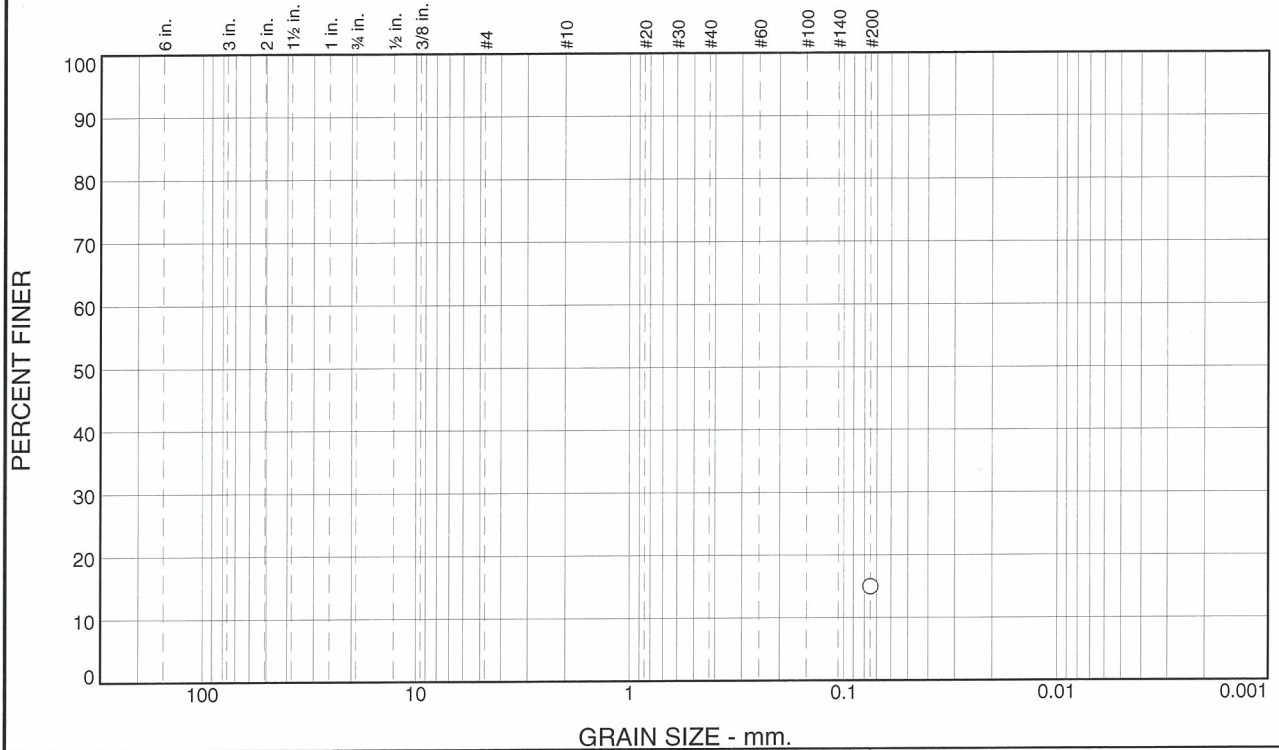
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						15.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	15.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014R, S11
Sample Number: S36280   Depth: 11-12.3   Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
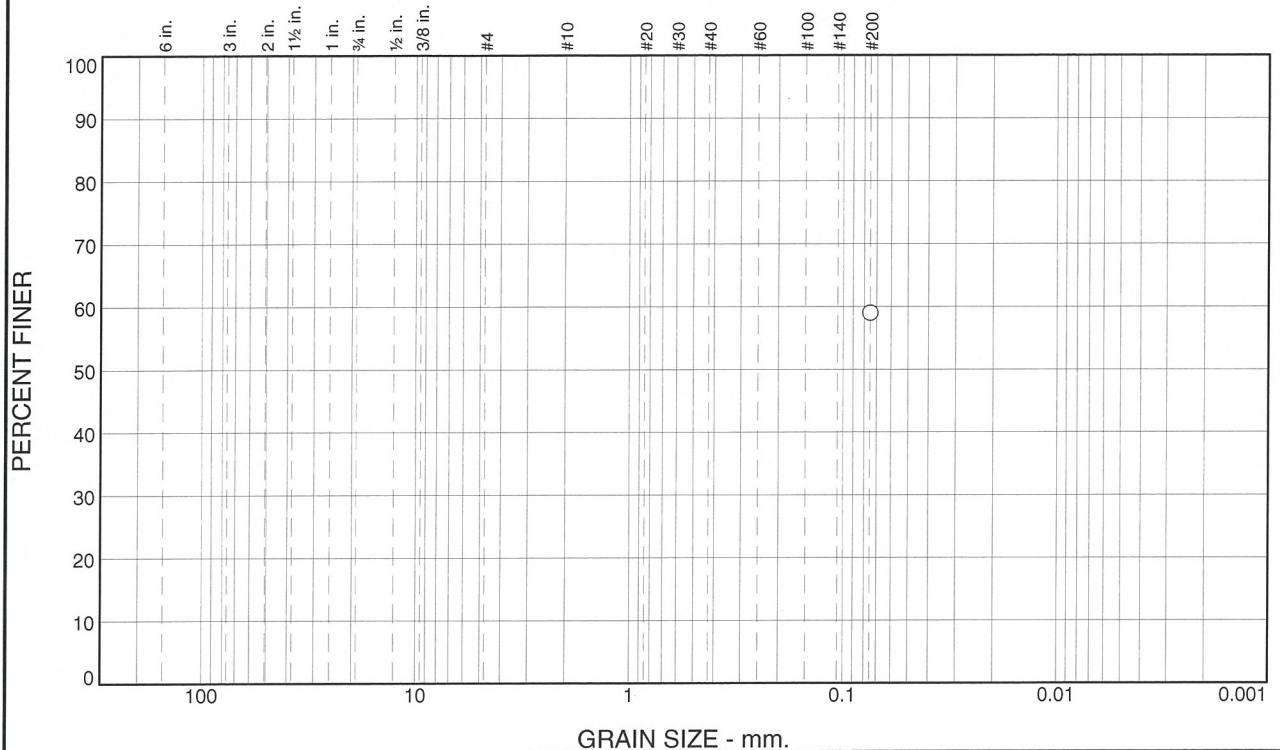
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.0		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

* (no specification provided)

Location: S0014R, S07
Sample Number: S35631   Depth: 12.5-13.9

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
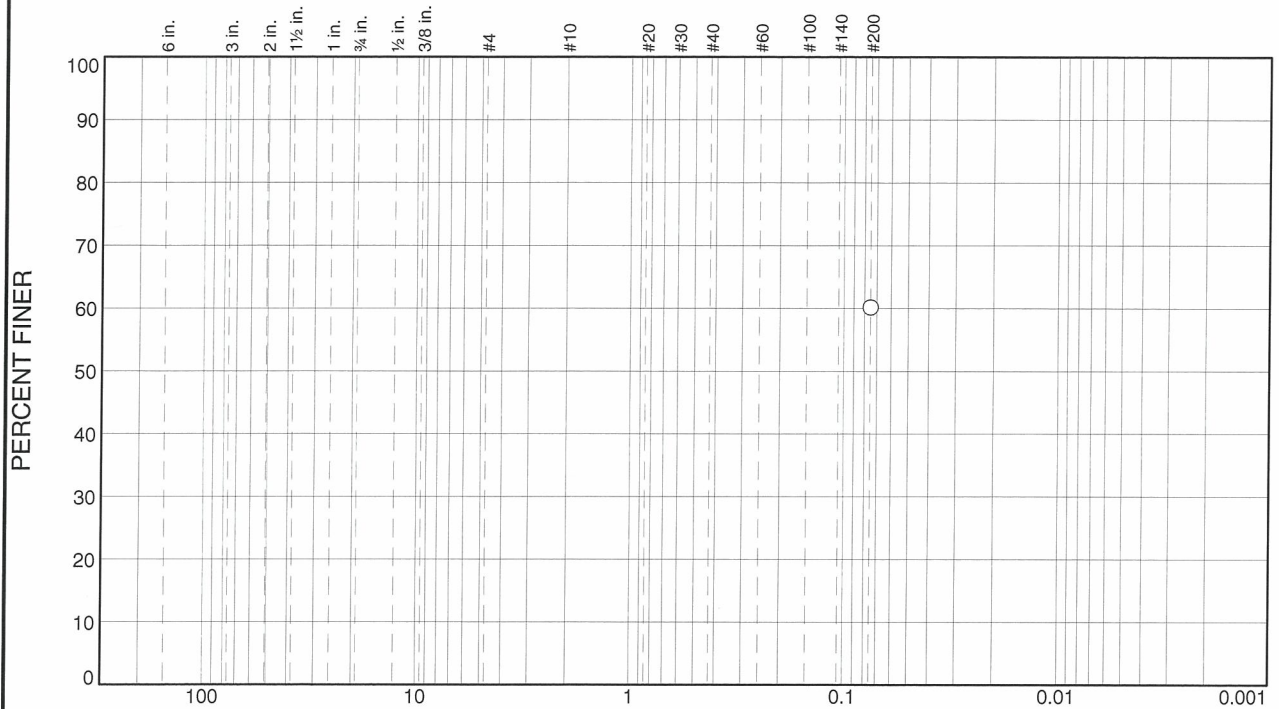
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	60.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S08
Sample Number: S35632   **Depth:** 14-15.2

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	60.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S12
Sample Number: S35634   **Depth:** 35-36.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
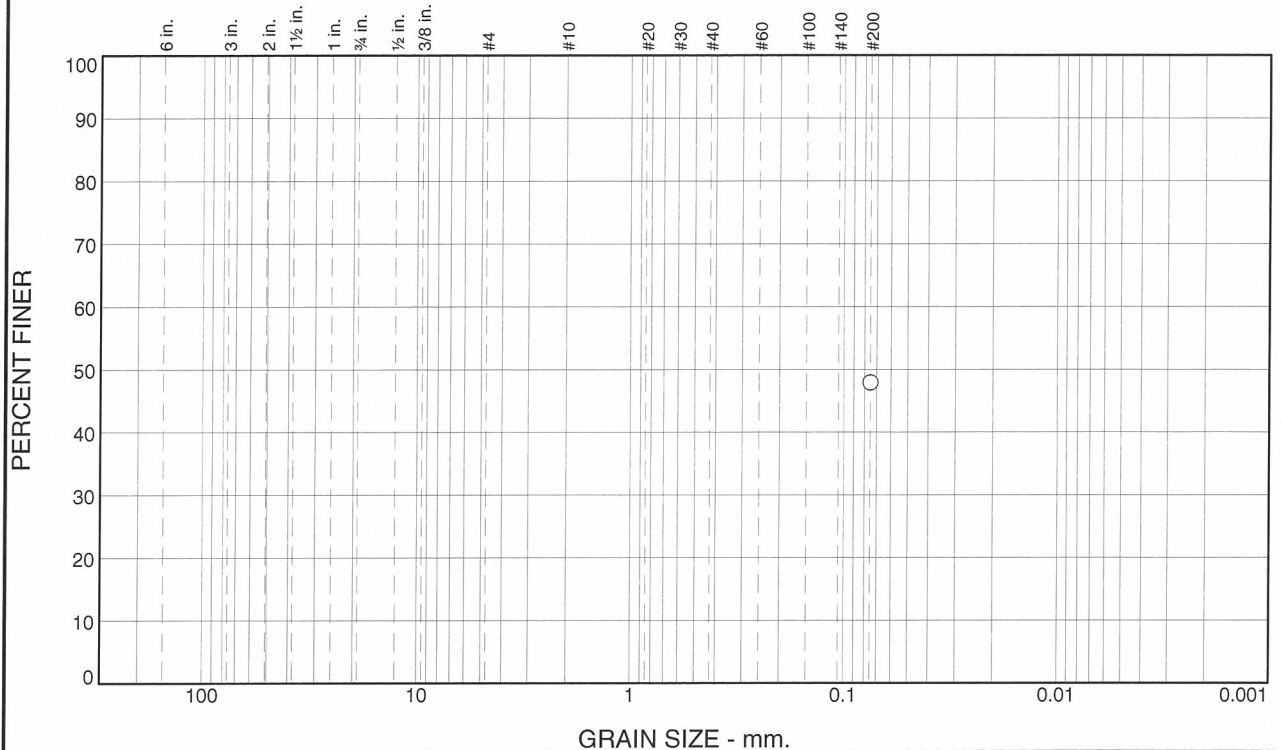
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						47.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	47.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0014R, S13
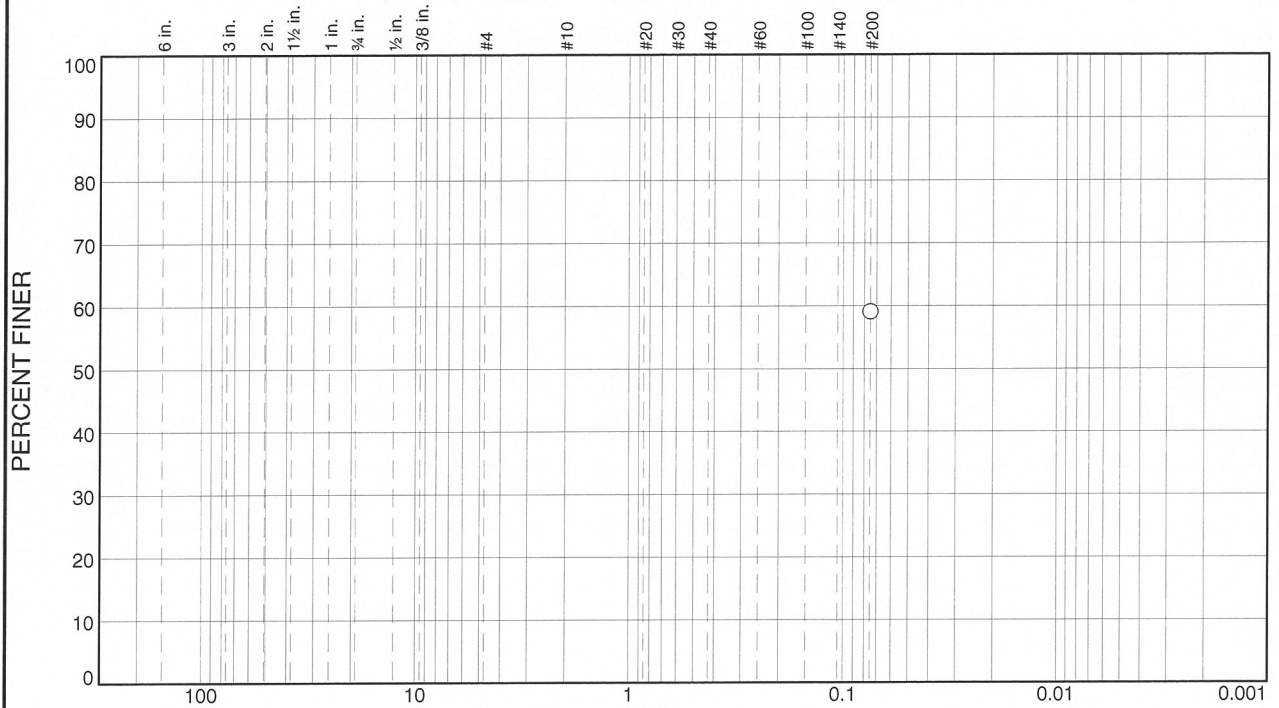**Sample Number:** S36281   **Depth:** 40-41.4

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
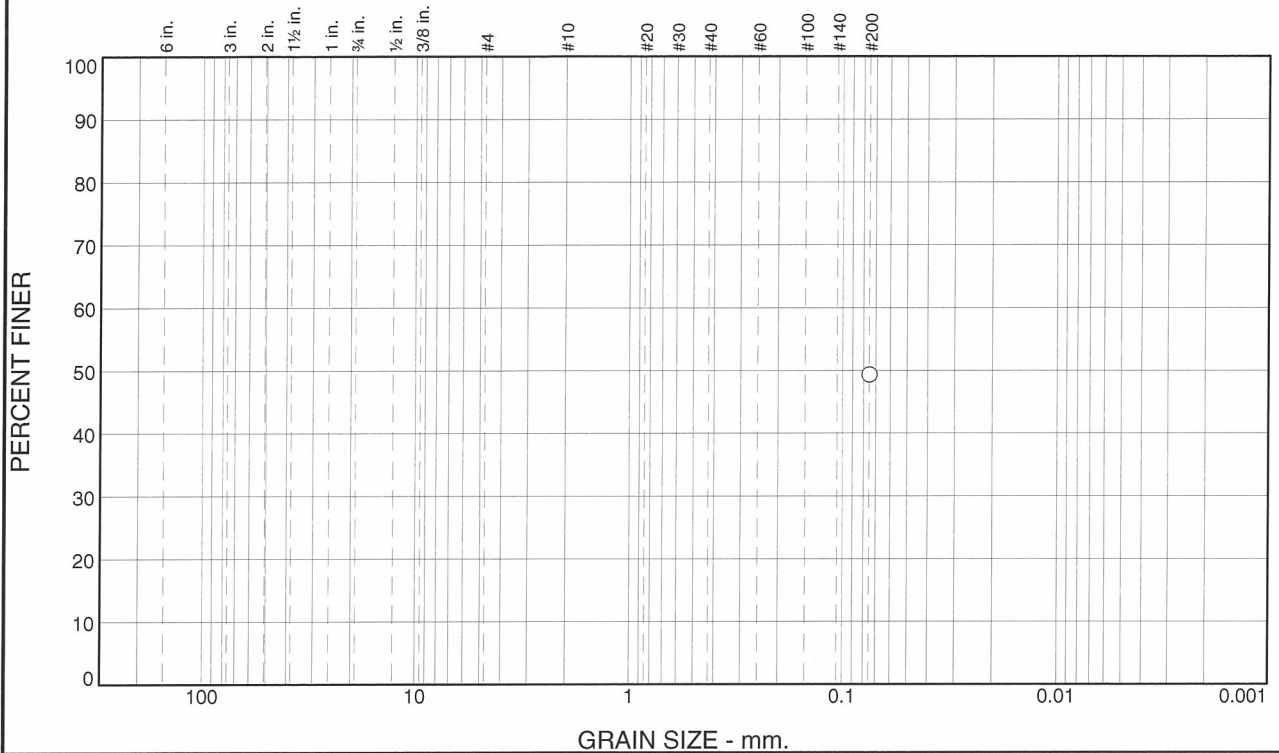
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						49.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	49.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S14

Sample Number: S35635   Depth: 45-46.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	75.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: AC
Checked By: CW
Title: PM

**Location:** S0014R, S16
Sample Number: S35637   **Depth:** 55-56.4

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.1	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	11.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S17
Sample Number: S35638   Depth: 60-61.2

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
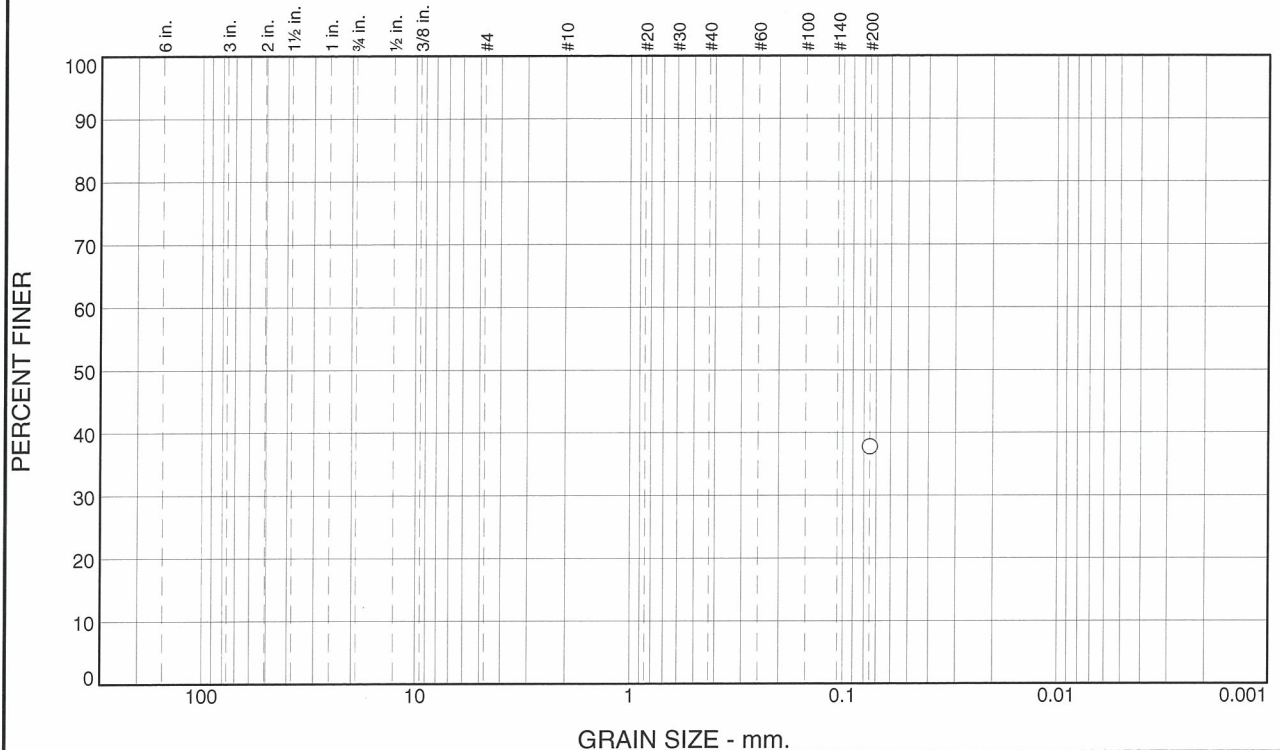
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	37.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: AC

Checked By: CW

Title: PM

Location: S0014R, S18B   Date Sampled:
Sample Number: S35639   Depth: 65.5-66.7

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
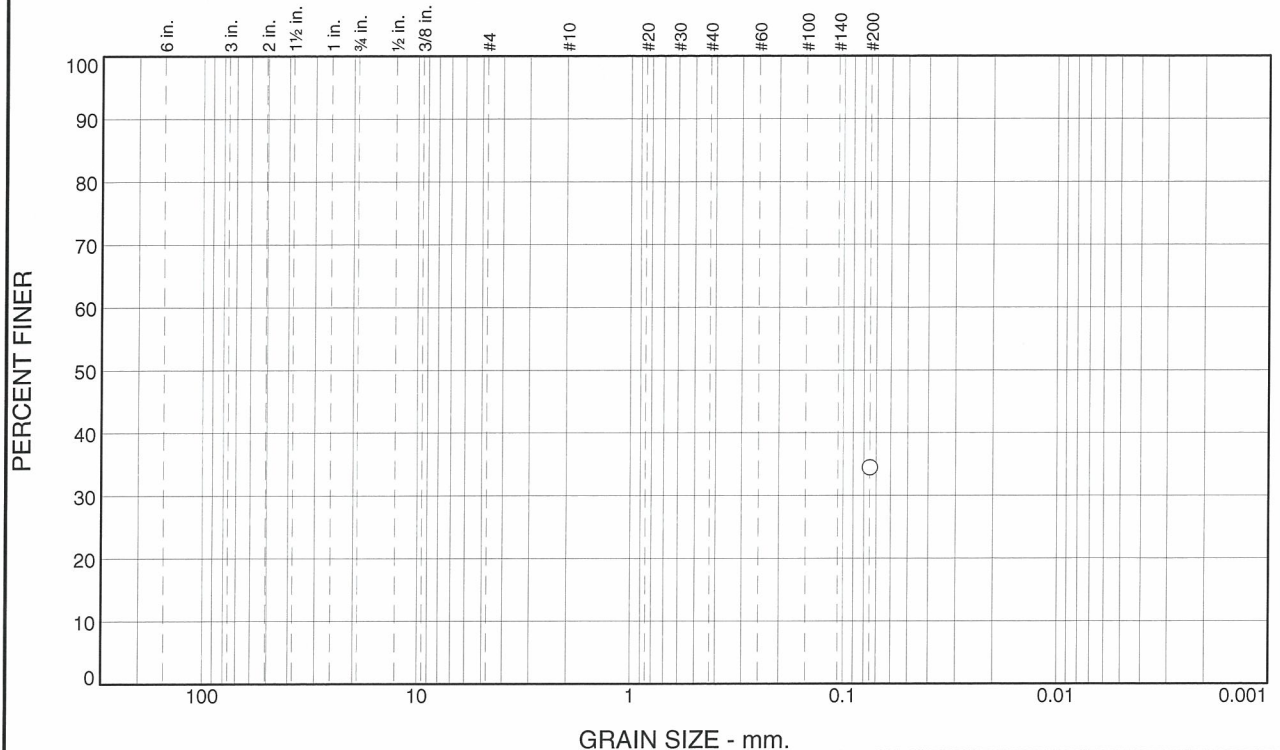
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	34.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S01
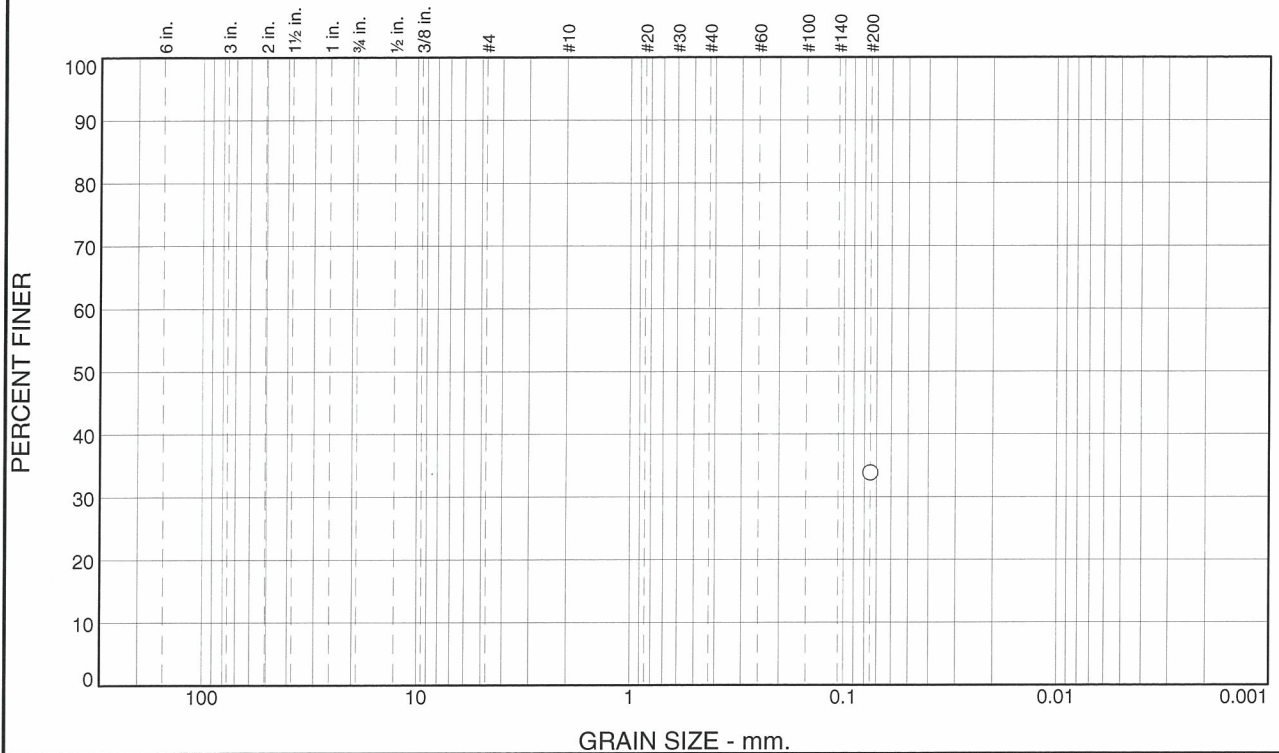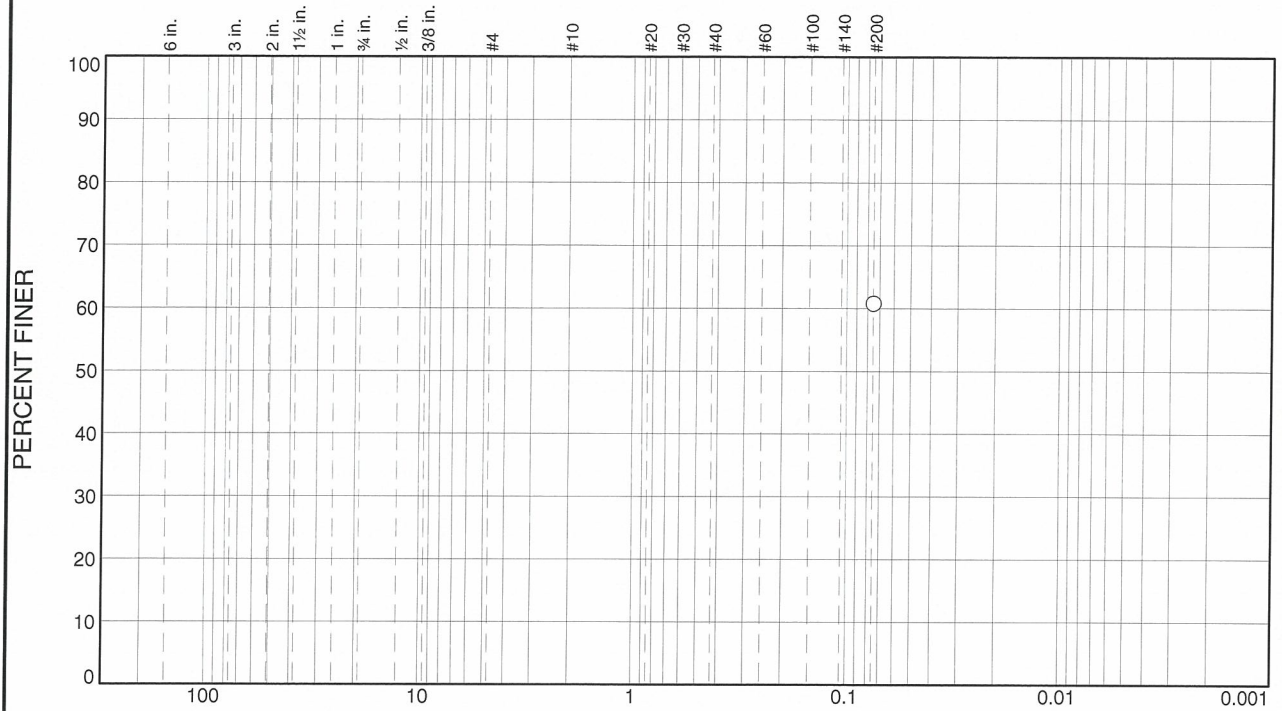Sample Number: S36286   Depth: 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
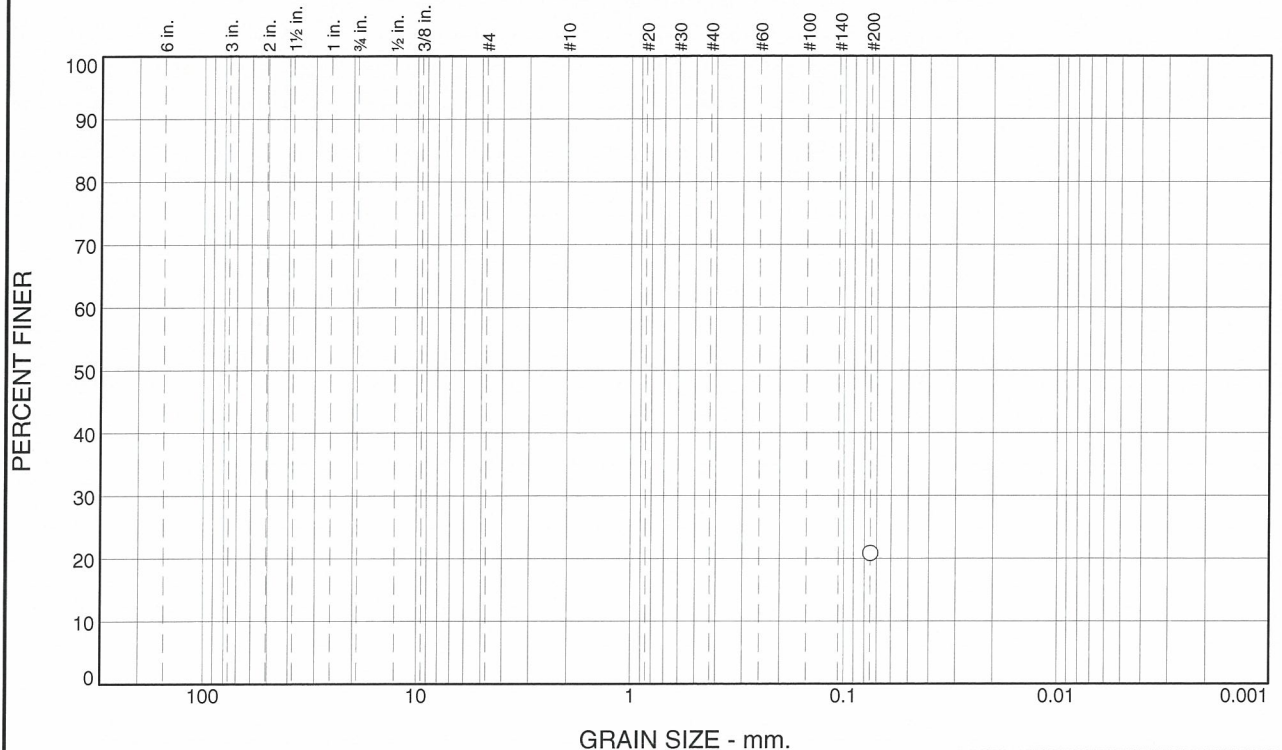
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						20.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	20.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S02
Sample Number: S36287   **Depth:** 5-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
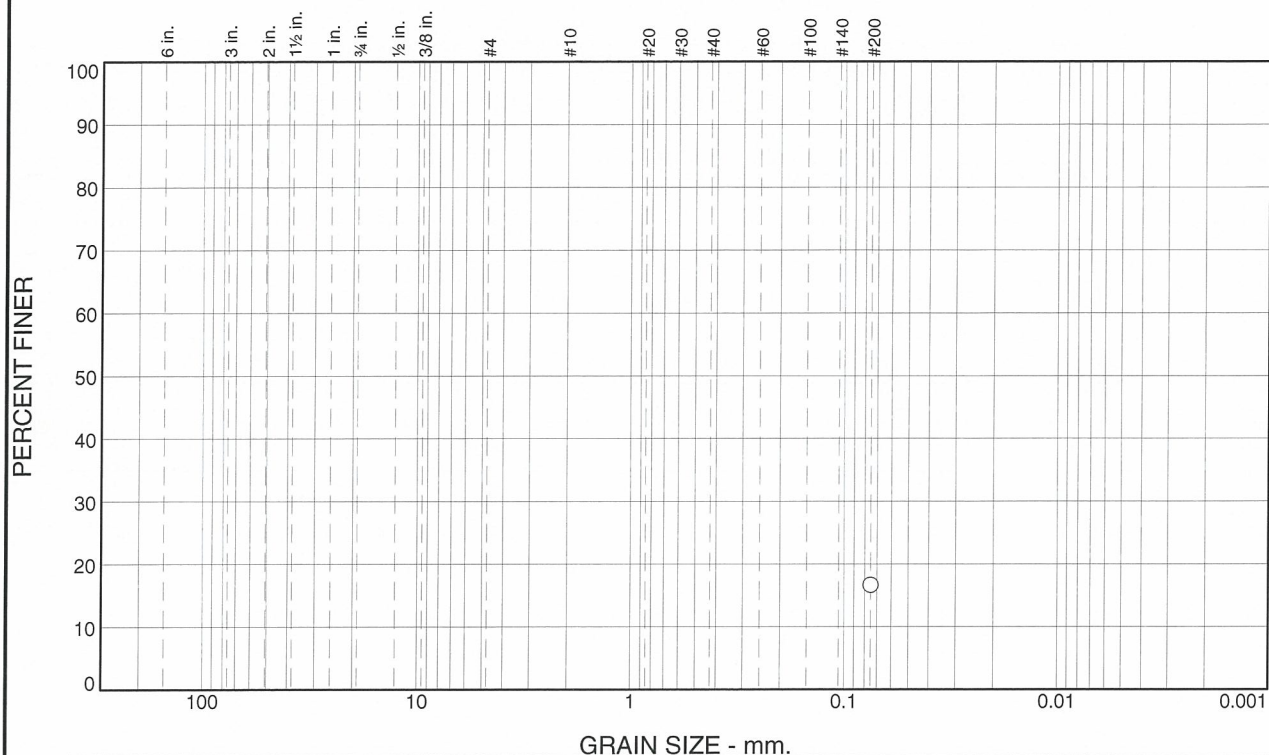
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						16.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	16.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks
Sample Bottle labeled S03A @ 6.5-7.0

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S08A
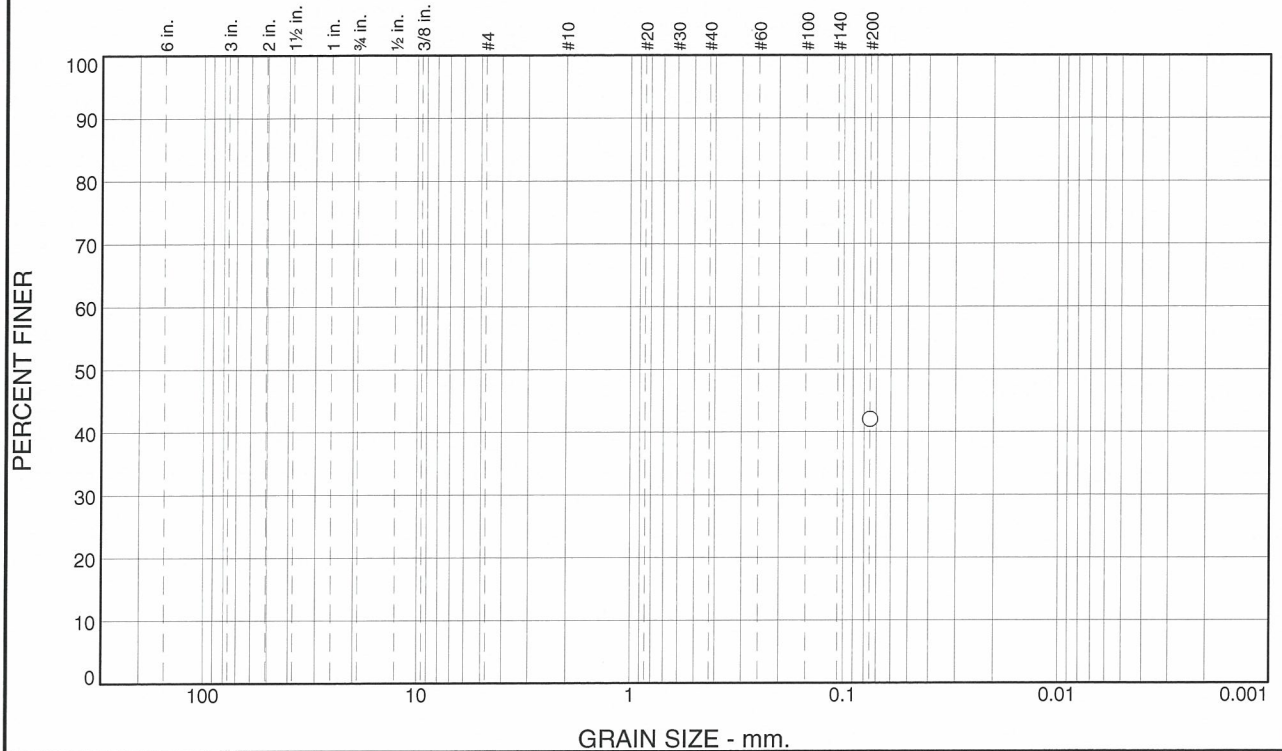**Sample Number:** S36288   **Depth:** 6.5-7.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						33.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	33.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S04

Sample Number: S35655   Depth: 8-9.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						31.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	31.6		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)
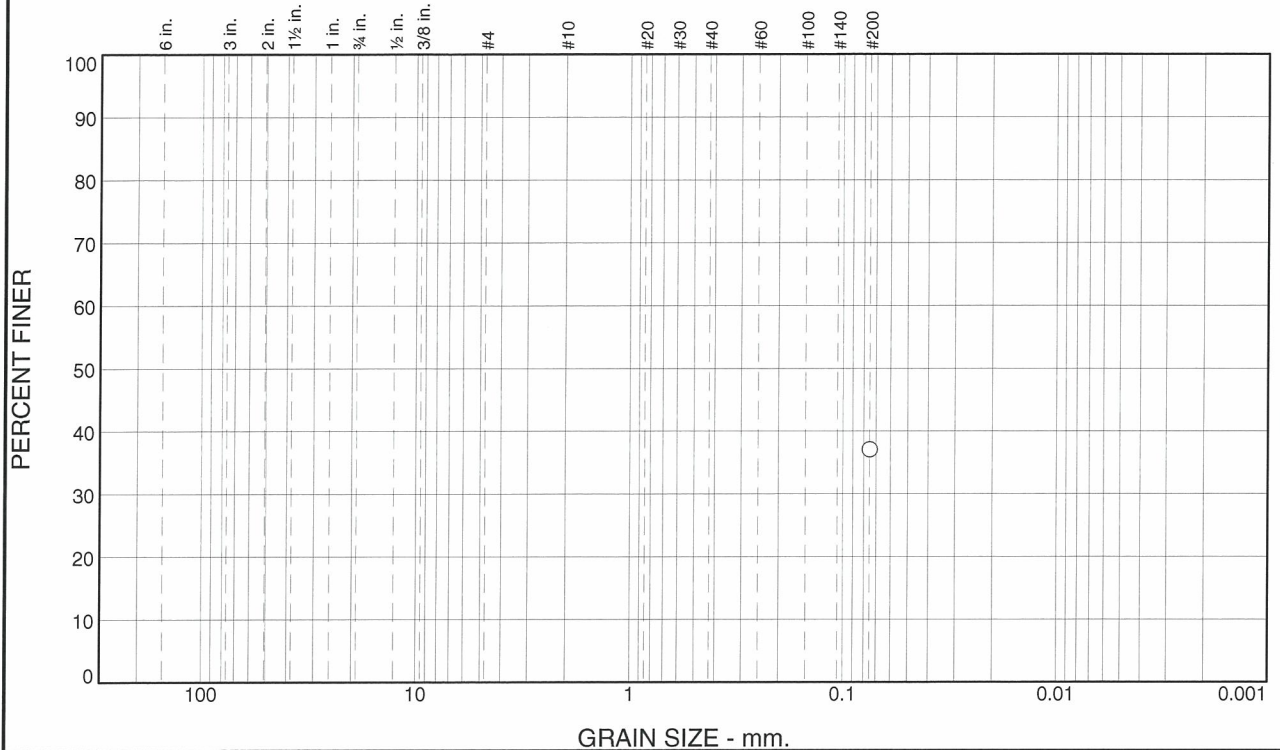
Location: S0015R, S05
Sample Number: S35656   Depth: 9.5-11

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	56.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: pm

Location: S0015R, S06B
Sample Number: S35657   Depth: 11.4-12.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
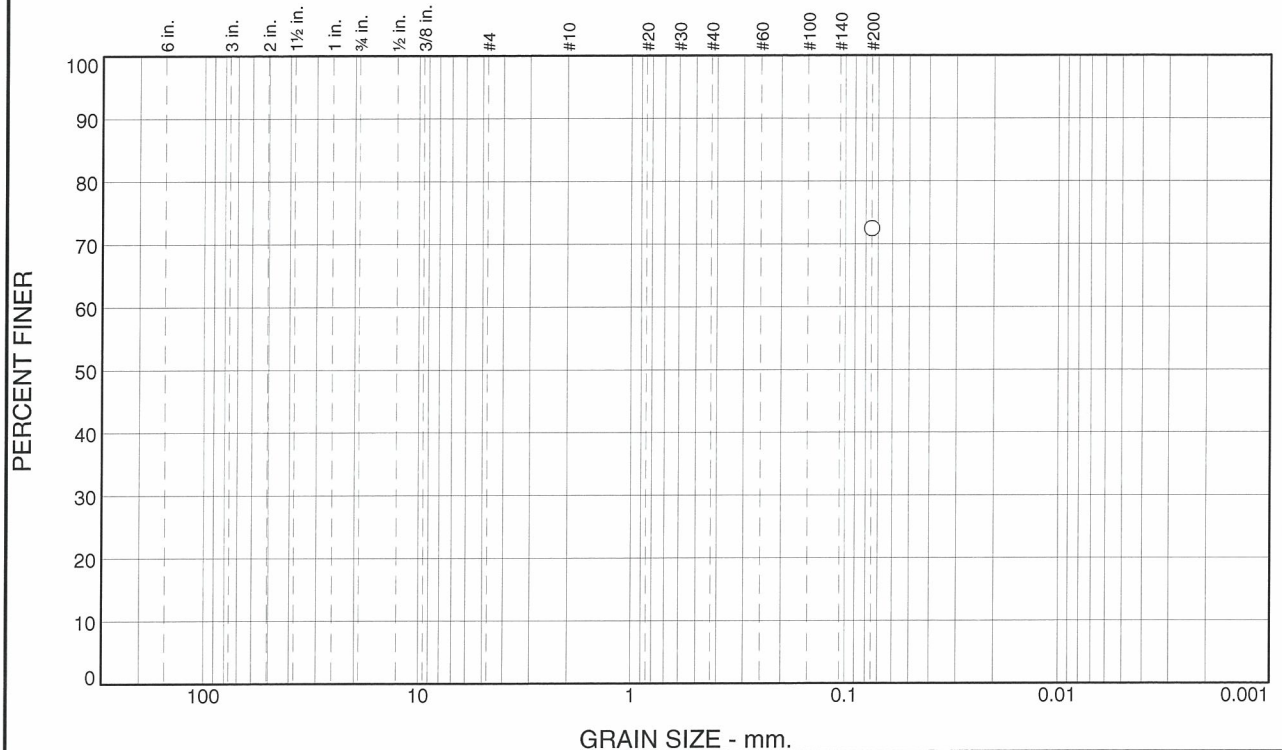
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						72.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	72.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　LL=　　　　　PI=

Classification
USCS (D 2487)=　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　$D_{85}=$　　　$D_{60}=$
$D_{50}=$　　　$D_{30}=$　　　$D_{15}=$
$D_{10}=$　　　$C_u=$　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: pm

Location: S0015R, S07B
Sample Number: S35658　　　Depth: 12.9-13.8

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
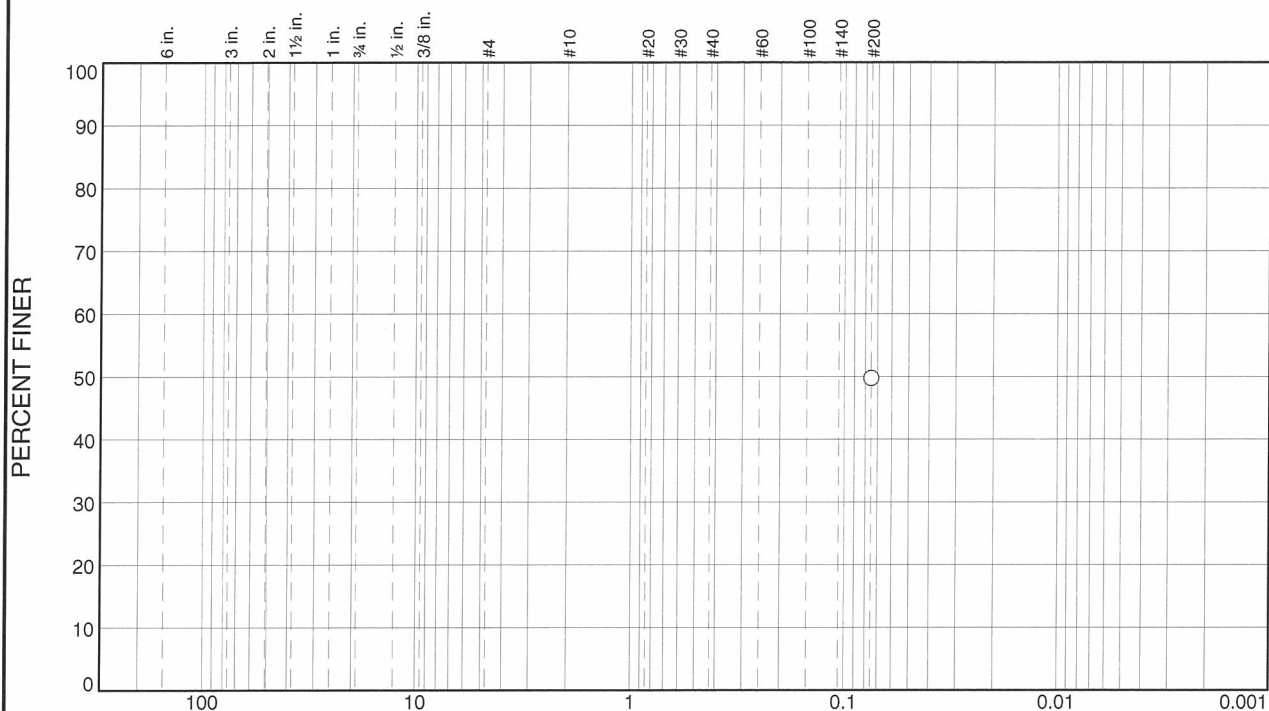
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　Figure

Particle Size Distribution Report
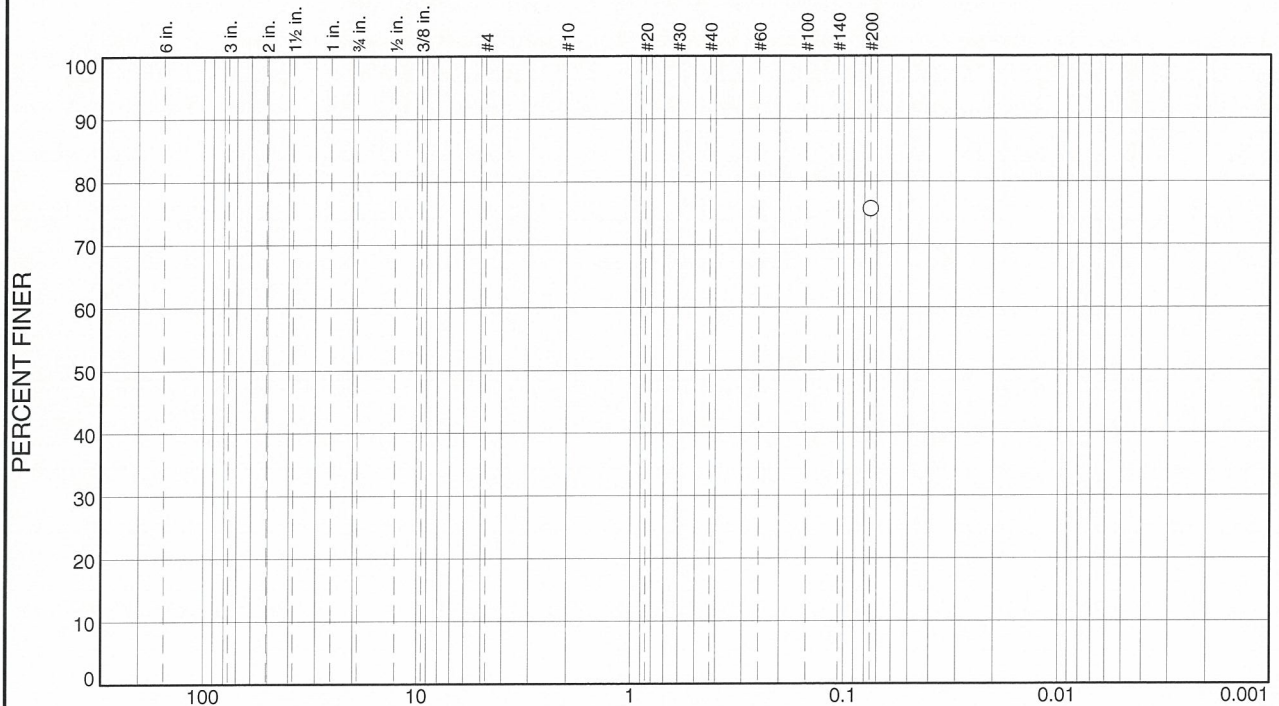
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	75.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: pm

Location: S0015R, S08

Sample Number: S35659   Depth: 14-15.5

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA
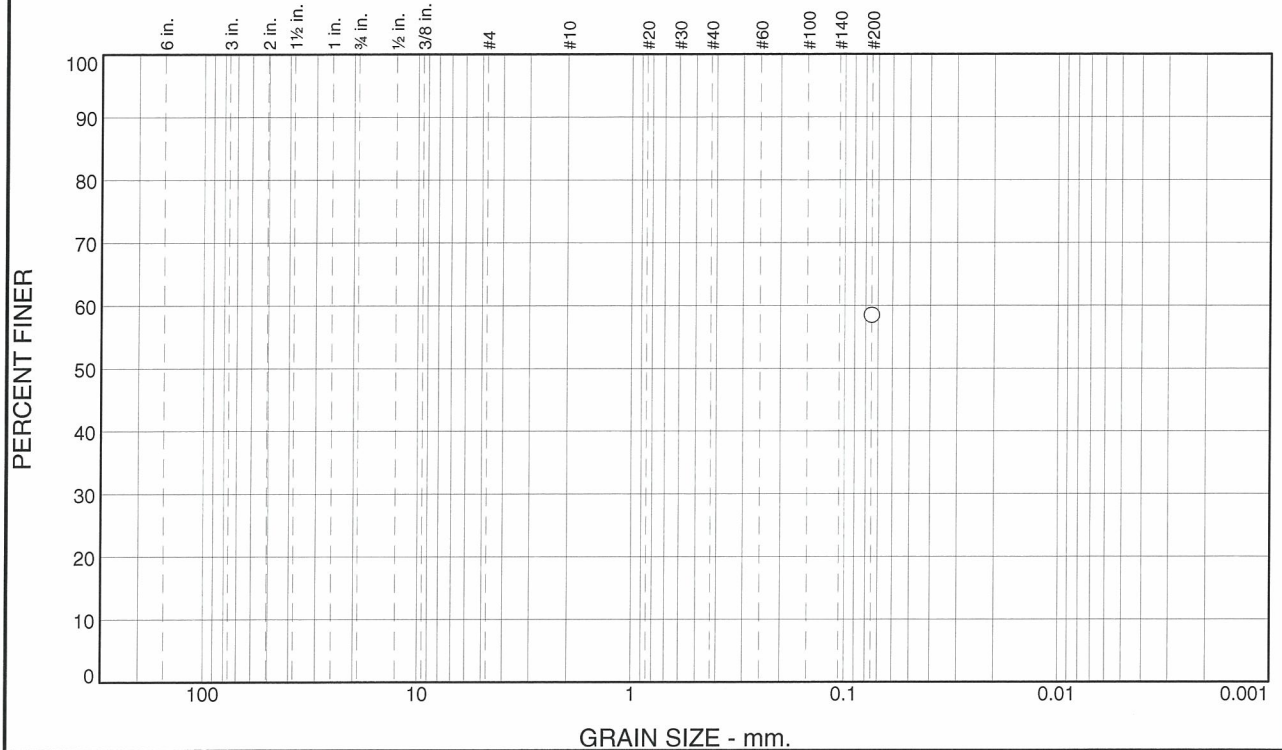
Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
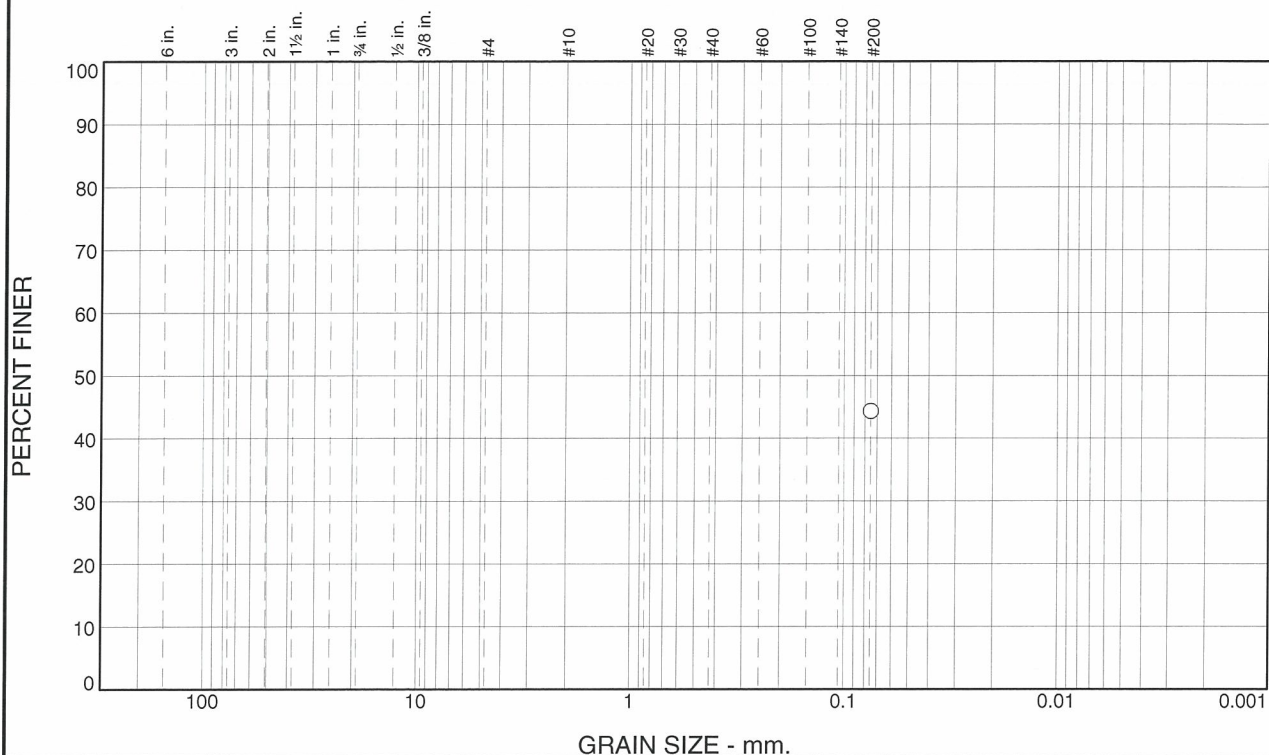
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	44.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0015R, S09A
Sample Number: S36289   **Depth:** 20-20.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA
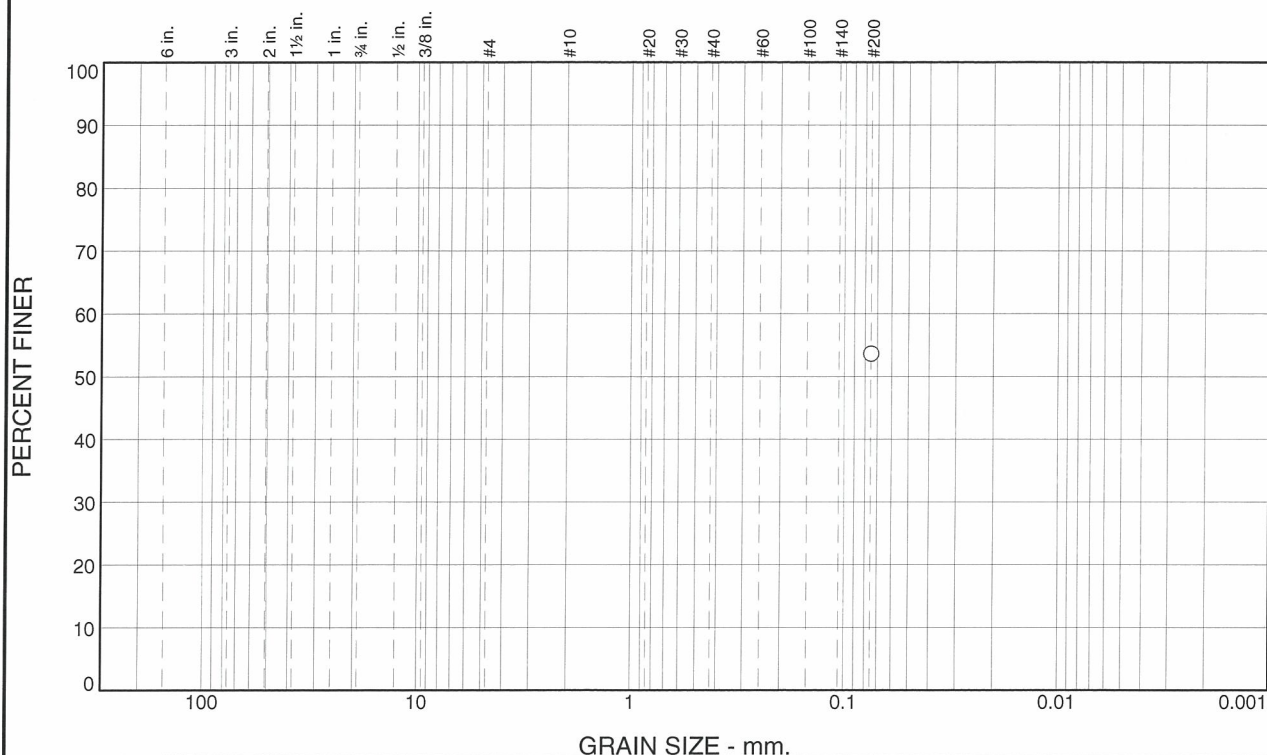
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S10
Sample Number: S36290   **Depth:** 25-26.5

Date Sampled:

SIERRA TESTING LABS, INC.
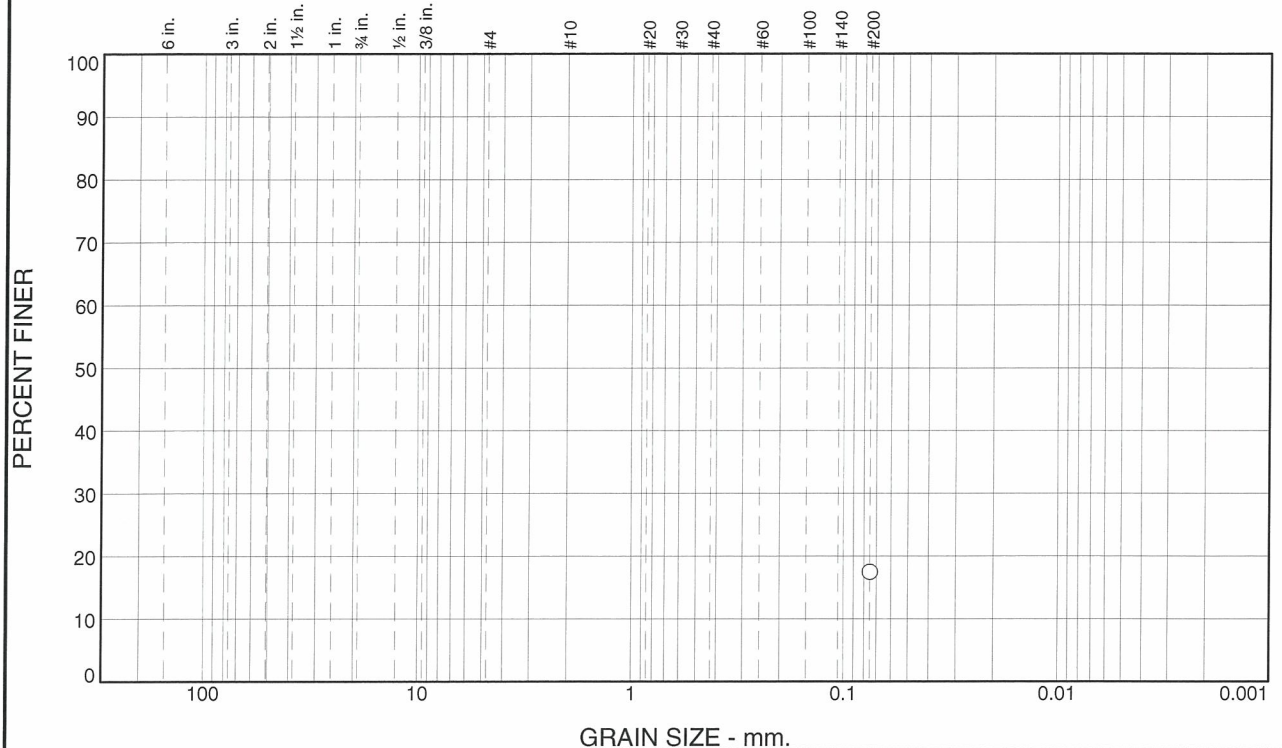## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
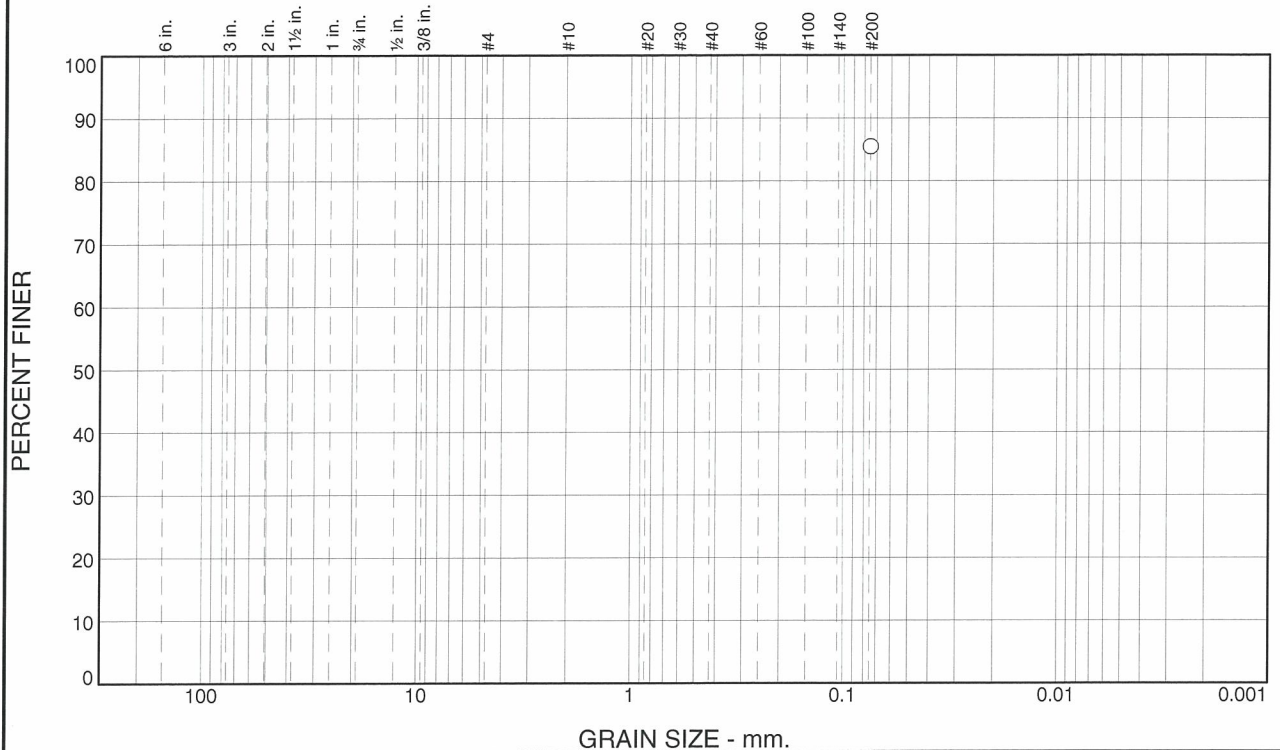
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						85.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	85.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0015R, S11B
Sample Number: S35660   **Depth:** 30.7-31.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
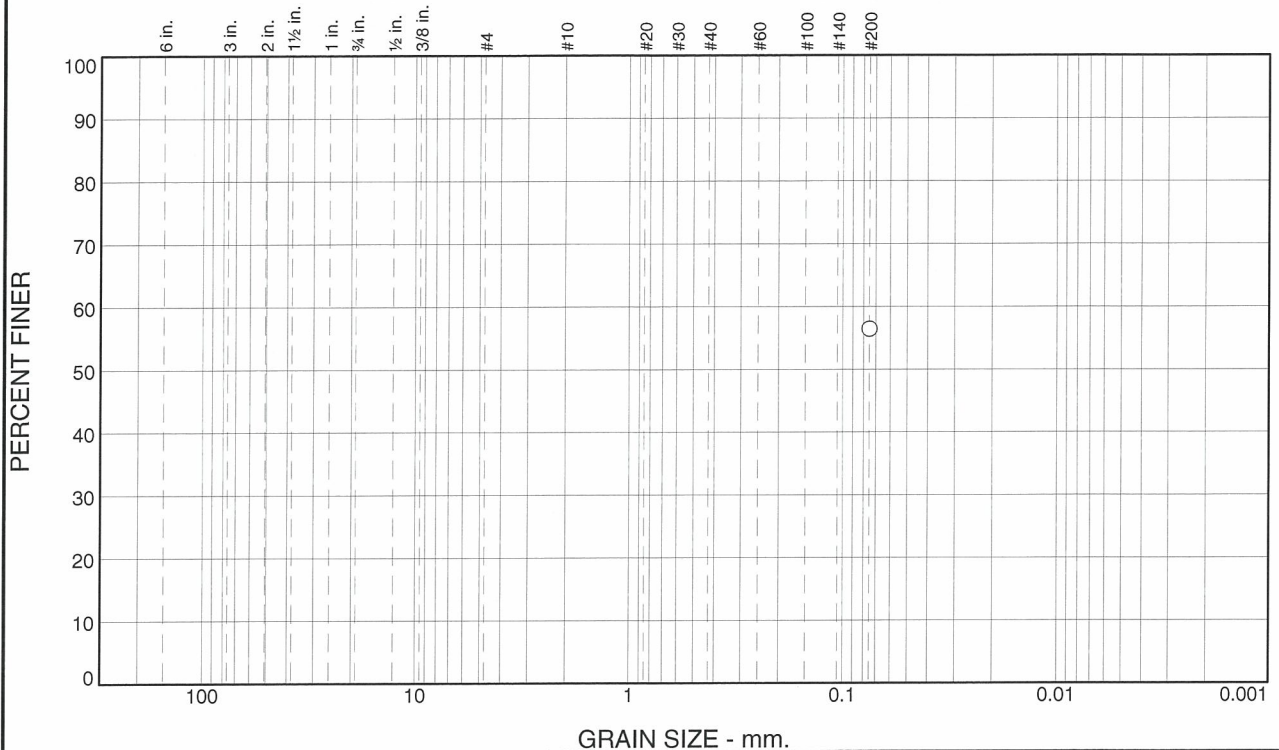
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	56.4		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0015R, S12B
Sample Number: S35661   **Depth:** 35.6-36.4

Date Sampled:

SIERRA
TESTING LABS, INC.
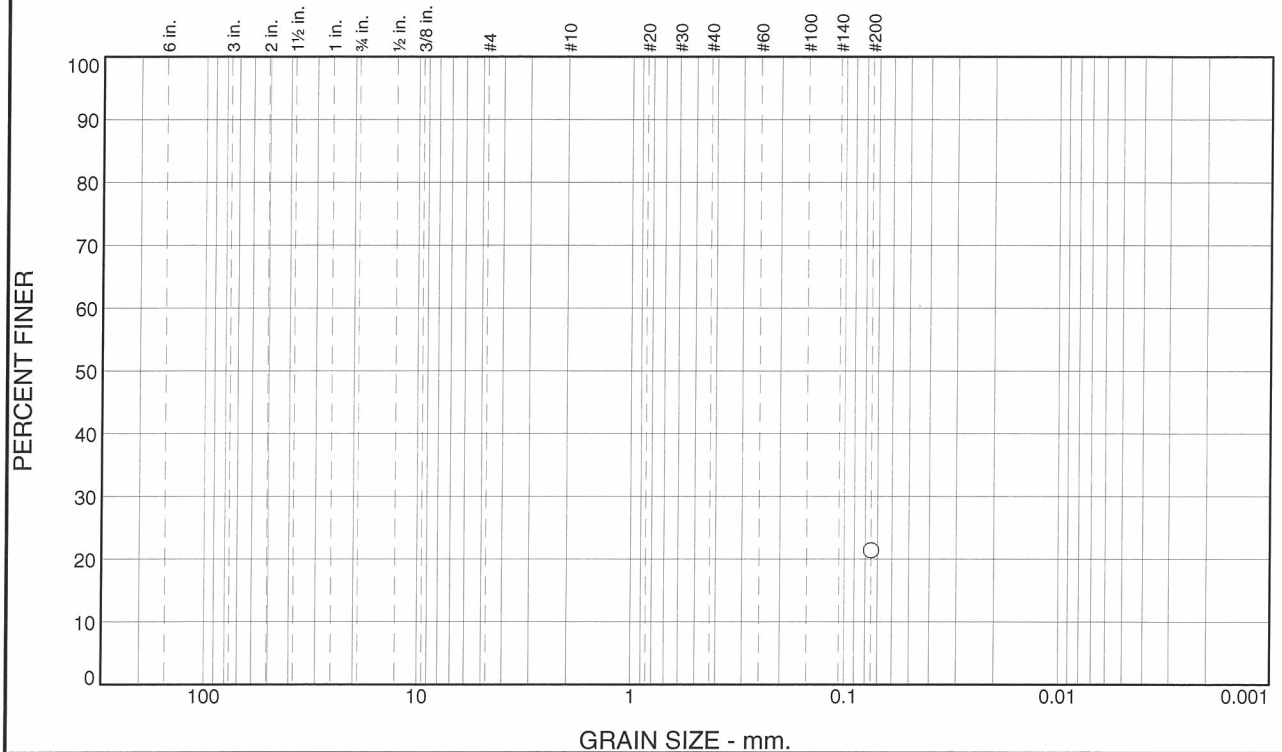## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

PERCENT FINER

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						49.8	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	49.8		

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0015R, S13
Sample Number: S35662   Depth: 40-41.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
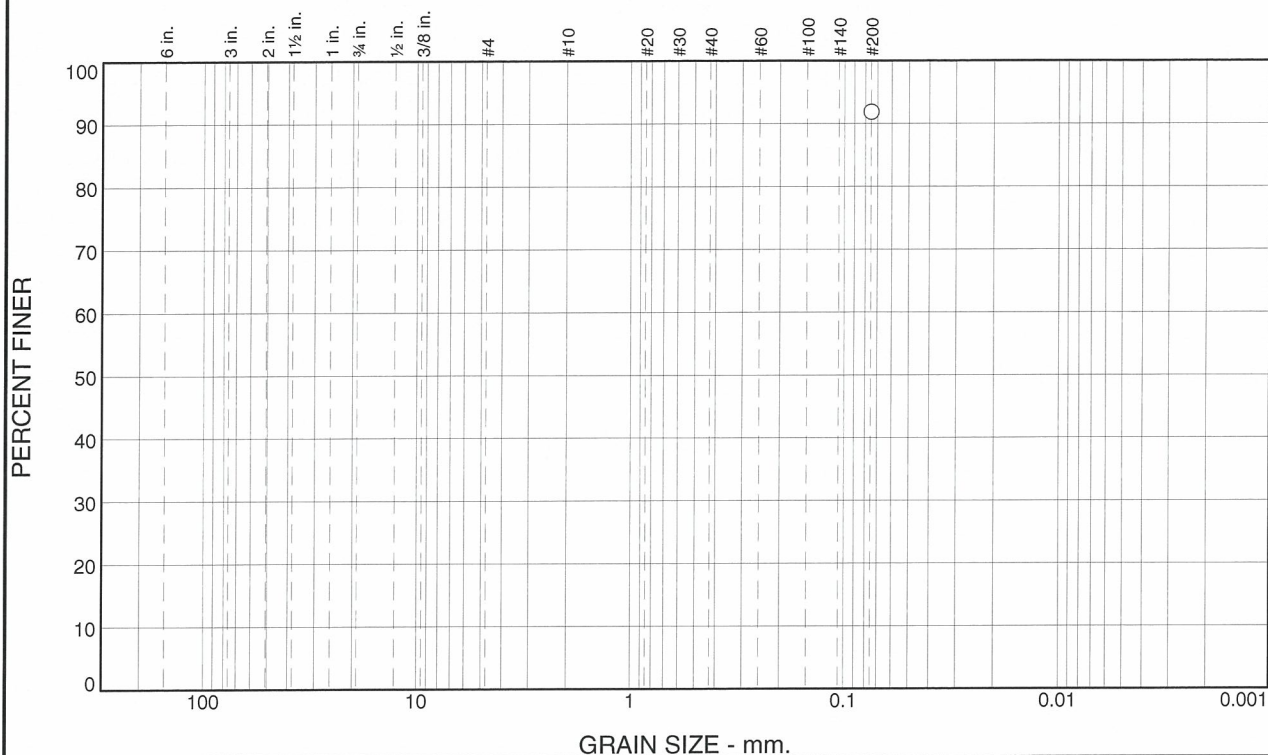
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						91.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	91.9		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

* (no specification provided)

Location: S0015R, S15A
Sample Number: S35663   Depth: 50-50.6

Date Sampled:

## SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	61.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/16/11　　**Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S01
Sample Number: S36292　　**Depth:** 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　**Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	62.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 16　　　　LL= 19　　　　PI= 3

Classification
USCS (D 2487)=　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　$D_{85}=$　　$D_{60}=$
$D_{50}=$　　$D_{30}=$　　$D_{15}=$
$D_{10}=$　　$C_u=$　　$C_c=$

Remarks

Date Received: 11/16/11　　**Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S02
Sample Number: S36293　　**Depth:** 5-6.0

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　**Figure**

Particle Size Distribution Report
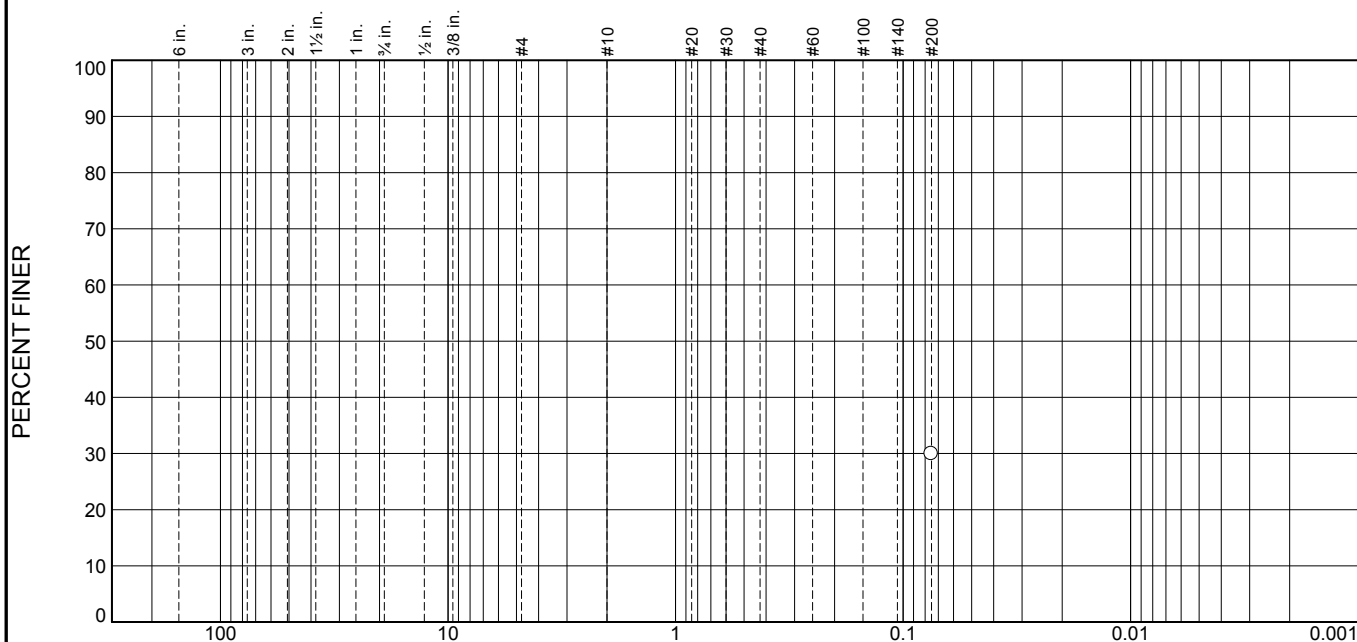
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:**   11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S03
Sample Number: S35664   **Depth:** 10-11.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
     Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						36.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	36.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: stu
Checked By: cw
Title: PM

Location: S0016R, S05
Sample Number: S35666   **Depth:** 20-21.3

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	7.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S08
Sample Number: S36294   **Depth:** 35-35.9

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
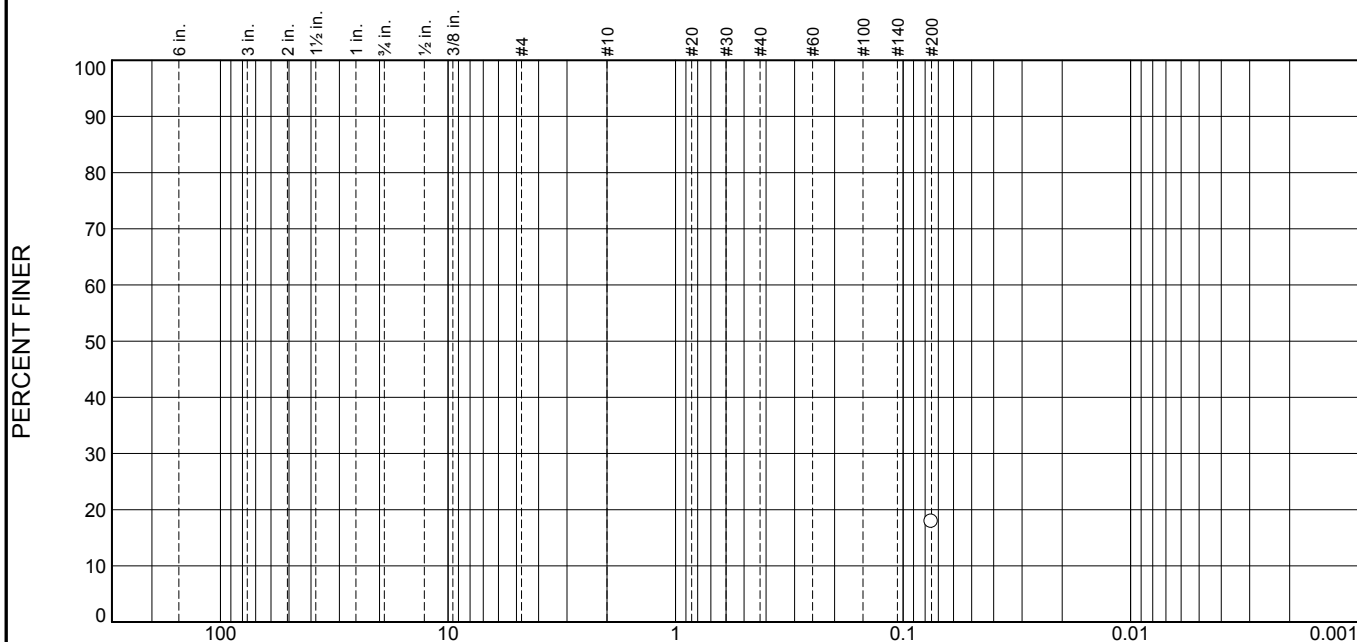
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						17.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	17.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Date Sampled:

Location: S0016R, S10
Sample Number: S35669   **Depth:** 45-46.2

SIERRA
TESTING LABS, INC.
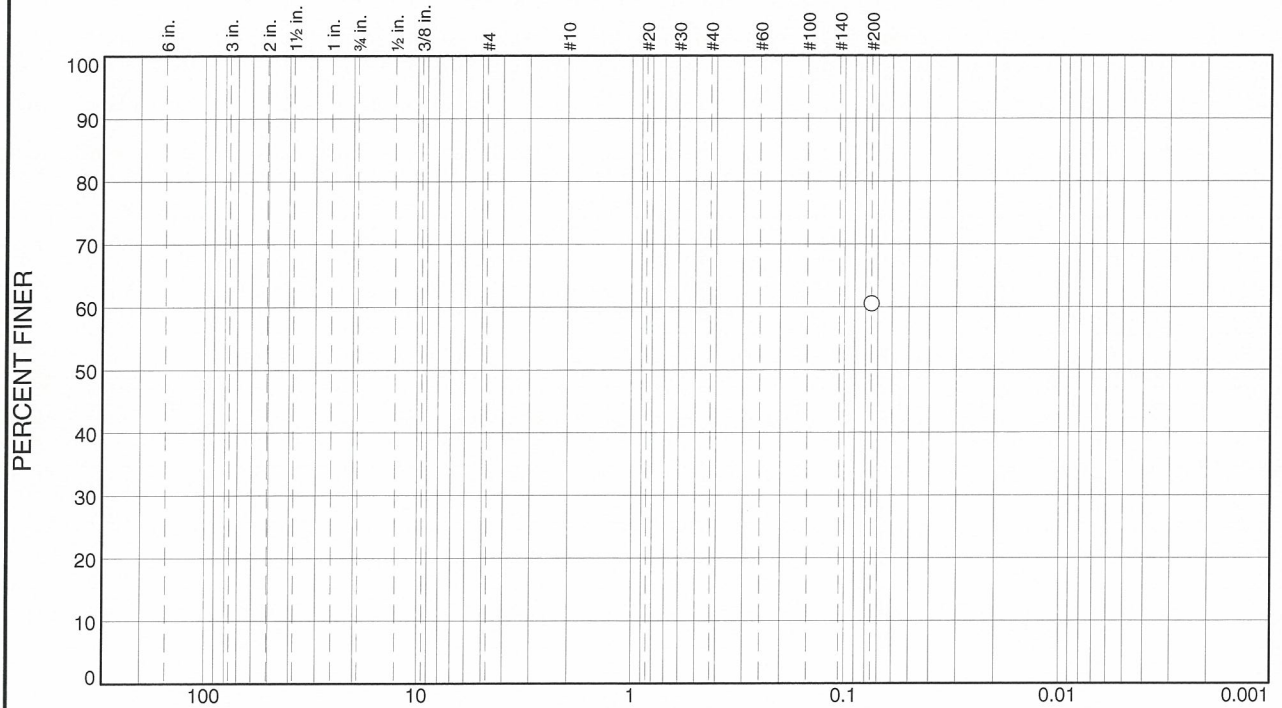## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	37.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
D$_{90}$=　　　　　D$_{85}$=　　　　　D$_{60}$=
D$_{50}$=　　　　　D$_{30}$=　　　　　D$_{15}$=
D$_{10}$=　　　　　C$_{u}$=　　　　　C$_{c}$=

Remarks

Date Received: 11/16/11　　　**Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0016R, S11A
Sample Number: S36295　　　**Depth:** 50-50.8

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　**Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 16   **LL=** 30   **PI=** 14

Classification
USCS (D 2487)=   **AASHTO (M 145)=**

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S11B
Sample Number: S35670   **Depth:** 50.8-51.5

Date Sampled:

SIERRA TESTING LABS, INC.
### El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
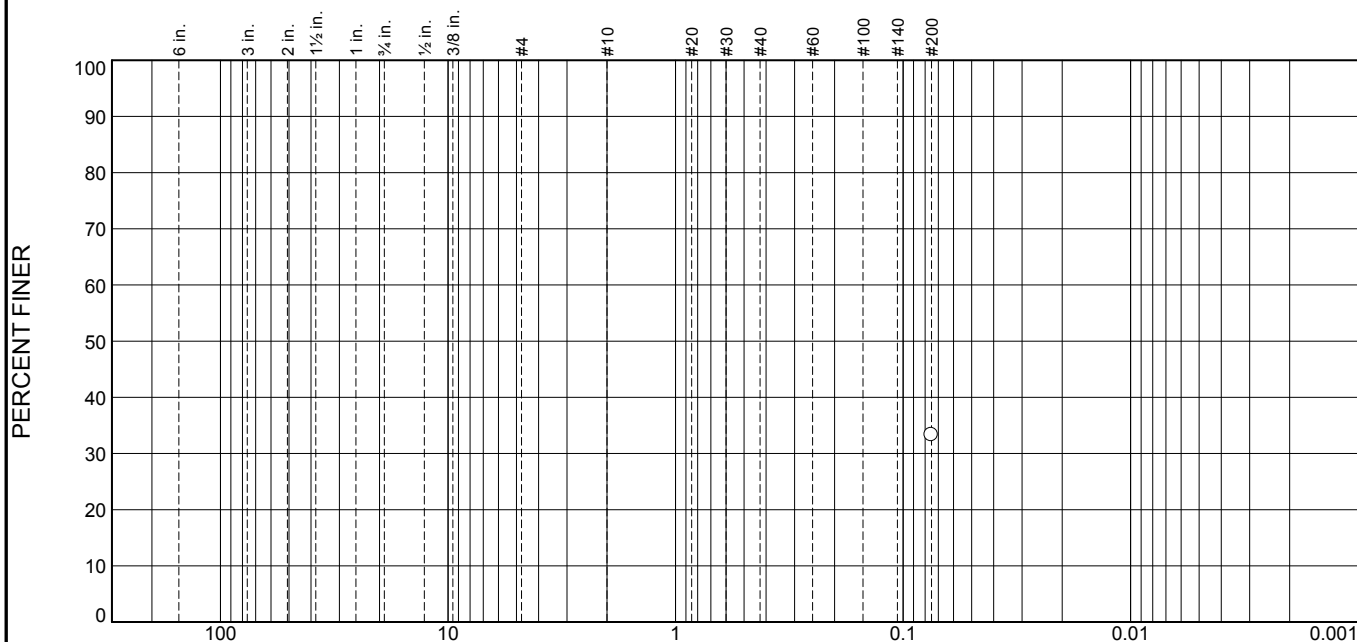
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						33.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	33.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S12
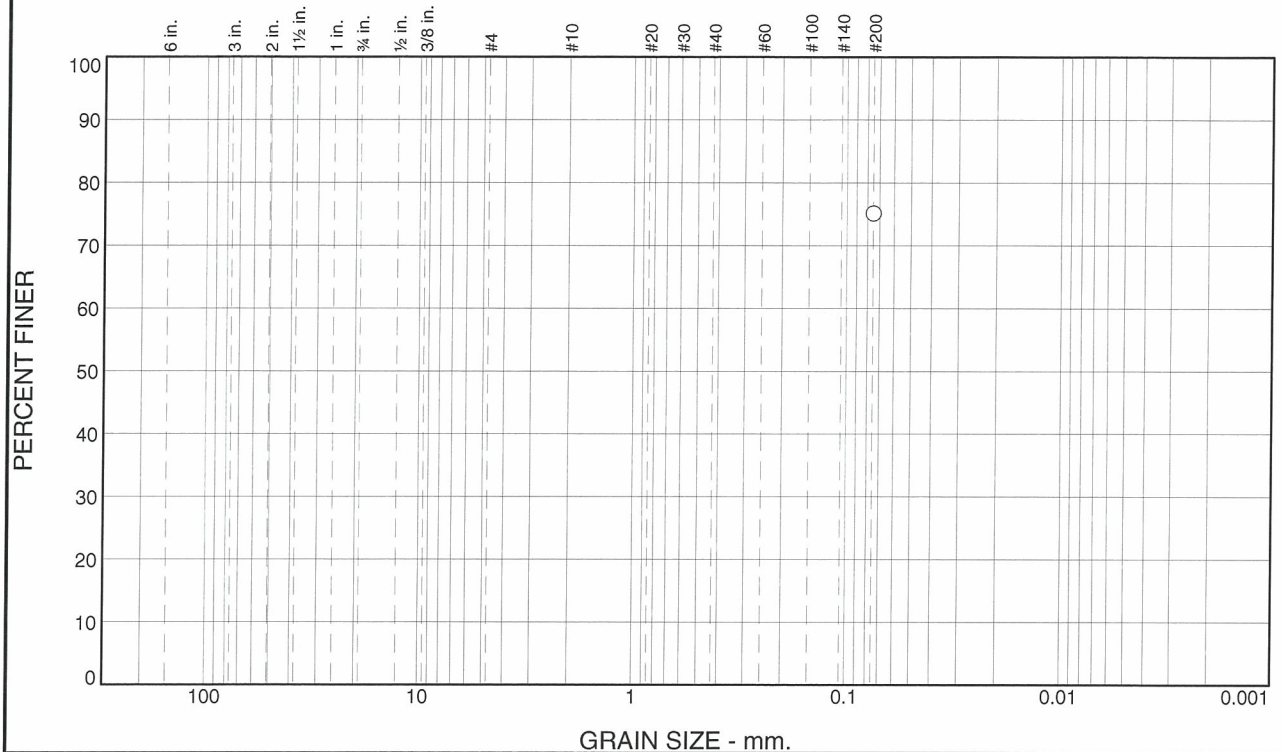**Sample Number:** S35671   **Depth:** 55-56.1

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						42.7	

GRAIN SIZE - mm.
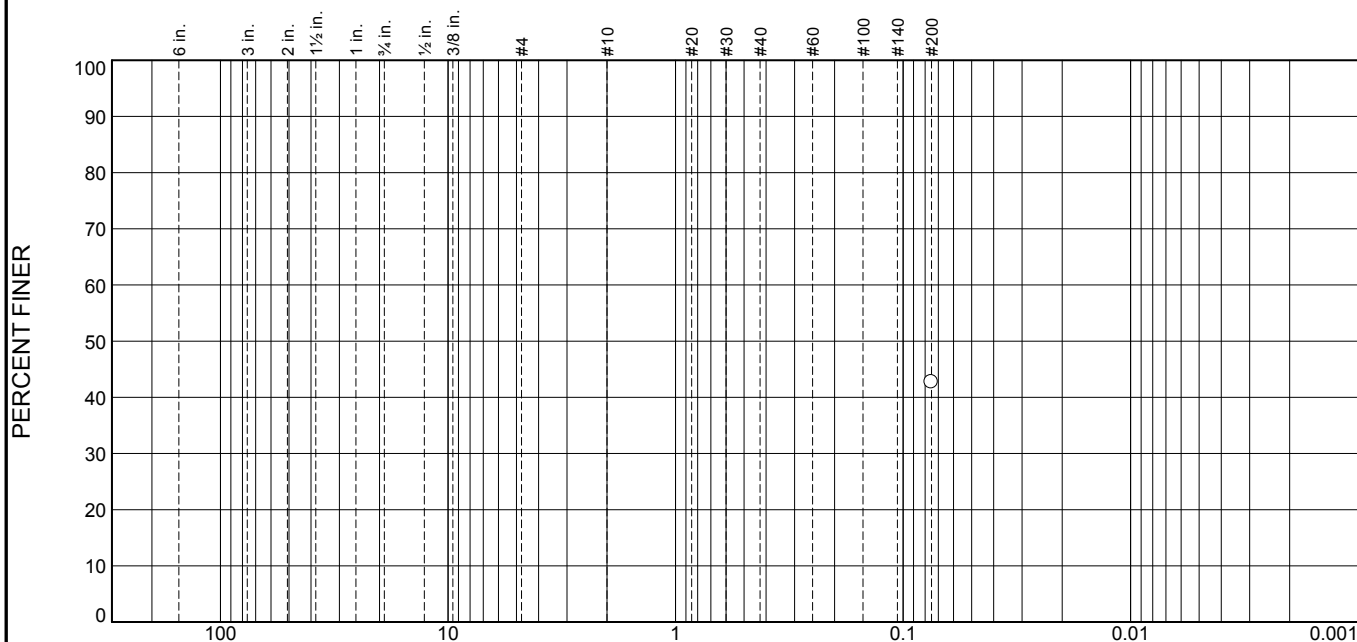
PERCENT FINER

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	42.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S13
Sample Number: S36296   **Depth:** 60-61.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						9.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	9.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/16/11　　**Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S14
Sample Number: S36297　　**Depth:** 65-65.9

Date Sampled:

SIERRA TESTING LABS, INC.
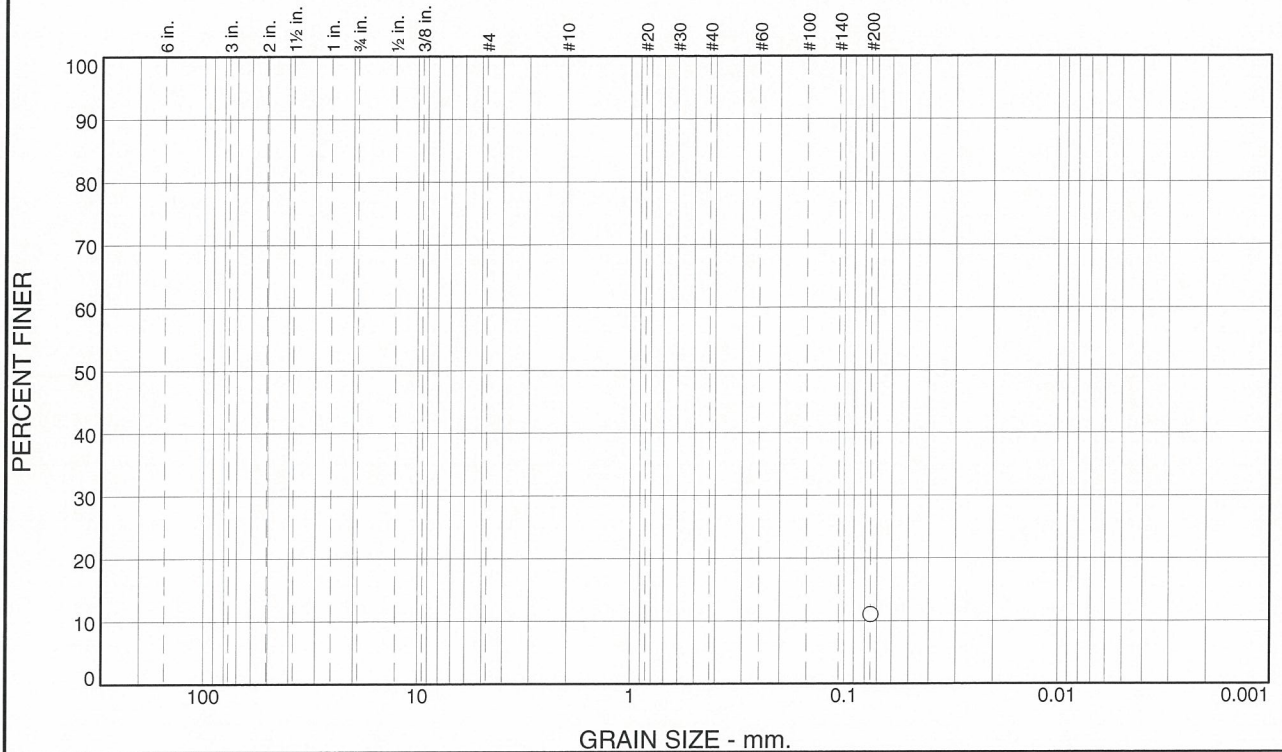## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　**Figure**

Particle Size Distribution Report
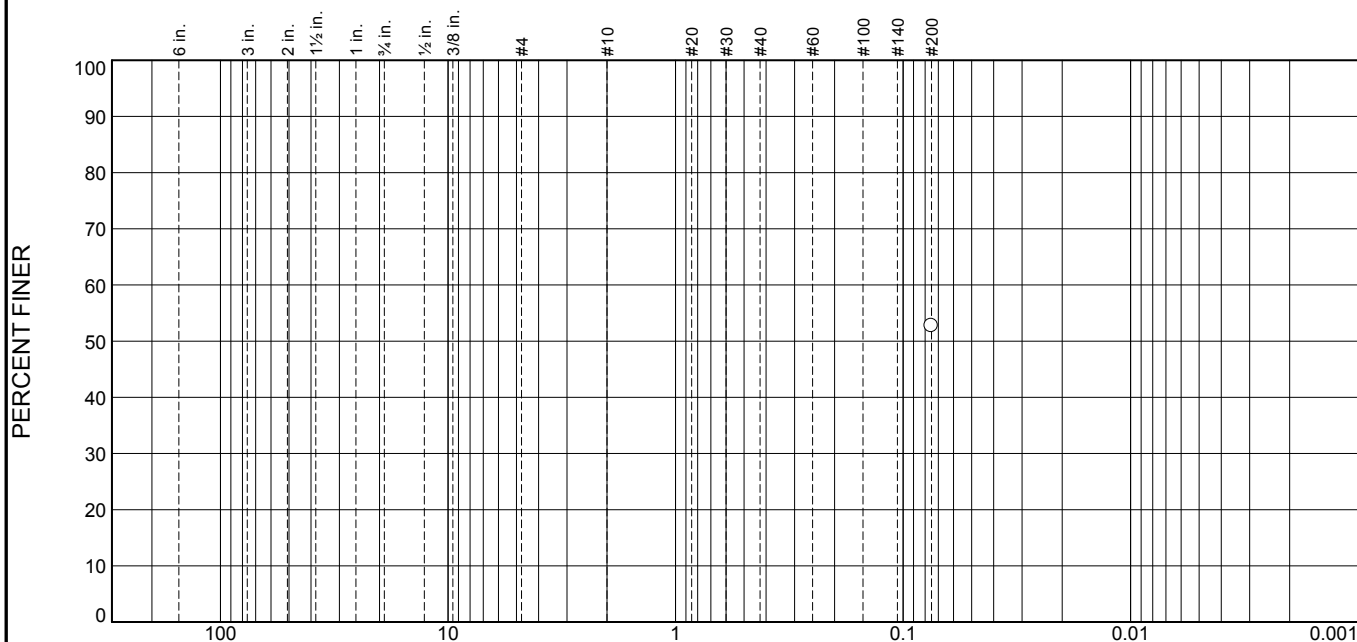
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.7	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	52.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S15
Sample Number: S35672   **Depth:** 70-71.5
Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	64.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 20 **LL=** 22 **PI=** 2

Classification
USCS (D 2487)= **AASHTO (M 145)=**

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11 **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S16
Sample Number: S35673 **Depth:** 75-76.2

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111 **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	46.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
D_{90}=　　　　D_{85}=　　　　D_{60}=
D_{50}=　　　　D_{30}=　　　　D_{15}=
D_{10}=　　　　C_u=　　　　C_c=

Remarks

Date Received: 11/1/11　　**Date Tested:**　11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S17
Sample Number: S35674　　**Depth:** 80-81.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client:　URS / HMM/ ARUP
Project:　CA High Speed Train
　　Fresno to Bakersfield Geotech Investigation
Project No:　11-111　　　　　　**Figure**

Particle Size Distribution Report

PERCENT FINER

Sieve sizes (top axis, left to right): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						26.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	26.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= LL= PI=

Classification
USCS (D 2487)= AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S20
Sample Number: S36298   **Depth:** 95-96.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						12.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	12.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S21B
Sample Number: S36299   **Depth:** 100.8-101.5

Date Sampled:

## SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes marked: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						12.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	12.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11
Tested By: ac
Checked By: cw
Title: PM

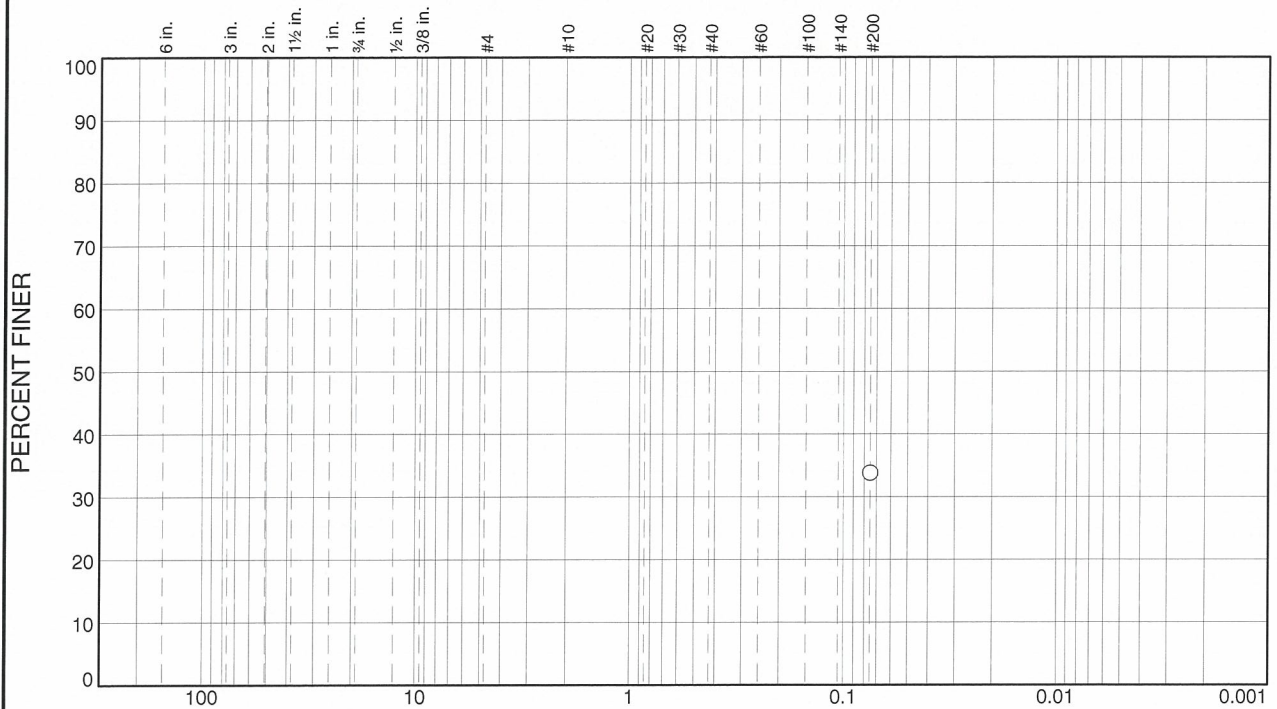**Location:** S0016R, S23A
Sample Number: S36300   **Depth:** 110-110.8

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.
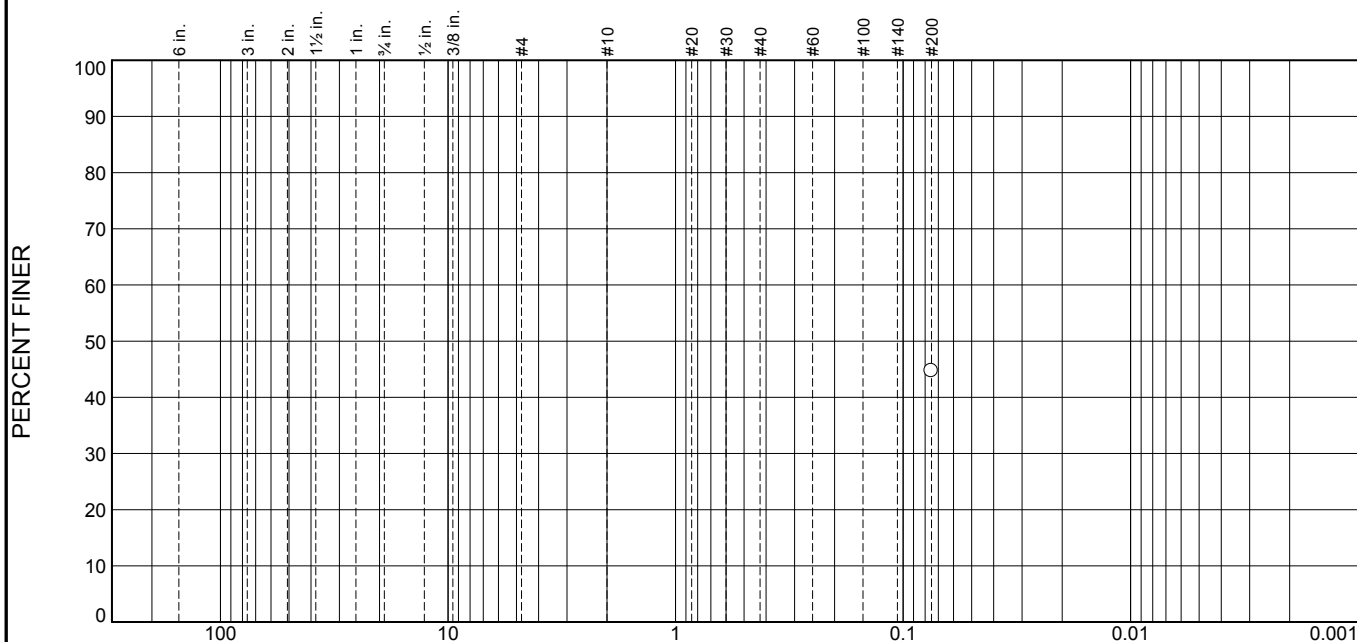
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.7	

TEST RESULTS				Material Description
Opening Size	**Percent Finer**	**Spec.*** **(Percent)**	**Pass?** **(X=Fail)**	
#200	44.7			

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

* (no specification provided)

Location: S0016R, S23B
Sample Number: S35678   **Depth:** 110.8-111.5   **Date Sampled:**

SIERRA TESTING LABS, INC. El Dorado Hills, CA	**Client:** URS / HMM/ ARUP **Project:** CA High Speed Train Fresno to Bakersfield Geotech Investigation **Project No:** 11-111 **Figure**

Particle Size Distribution Report

PERCENT FINER (y-axis, 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

Sieve sizes marked: 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						55.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	55.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S24
Sample Number: S35679   **Depth:** 115-116.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

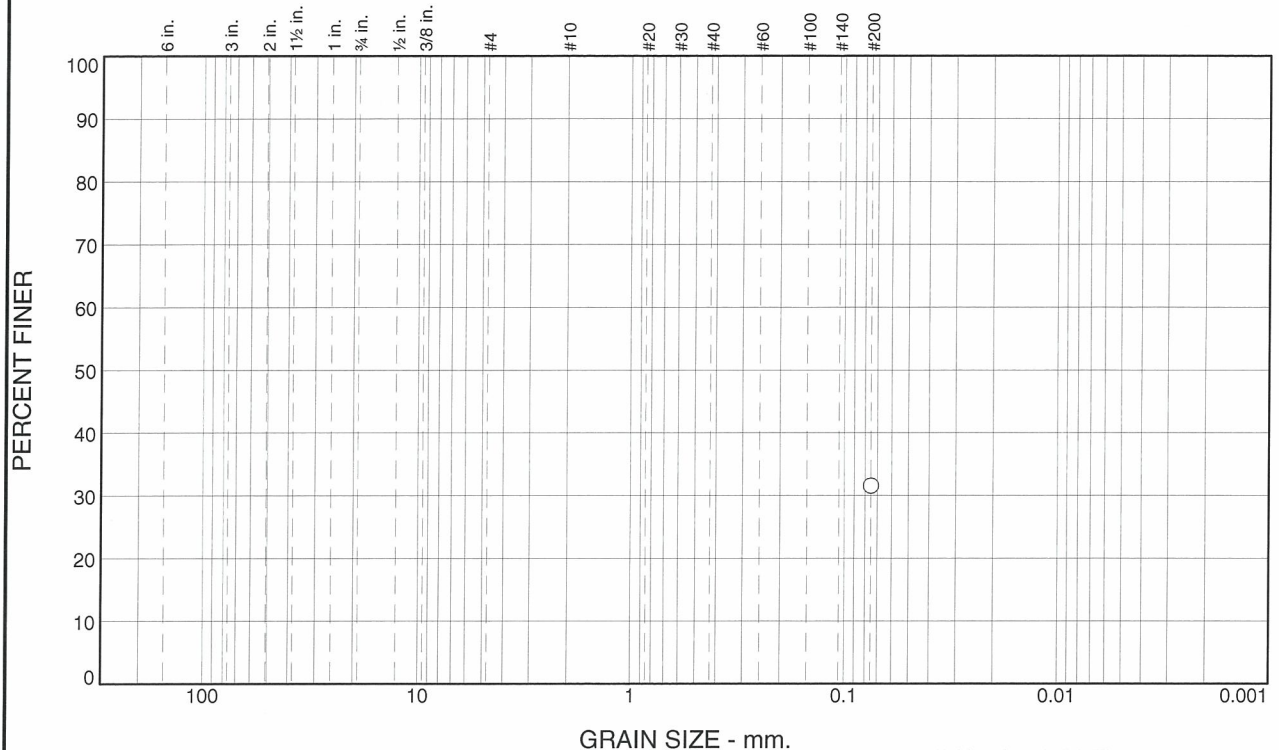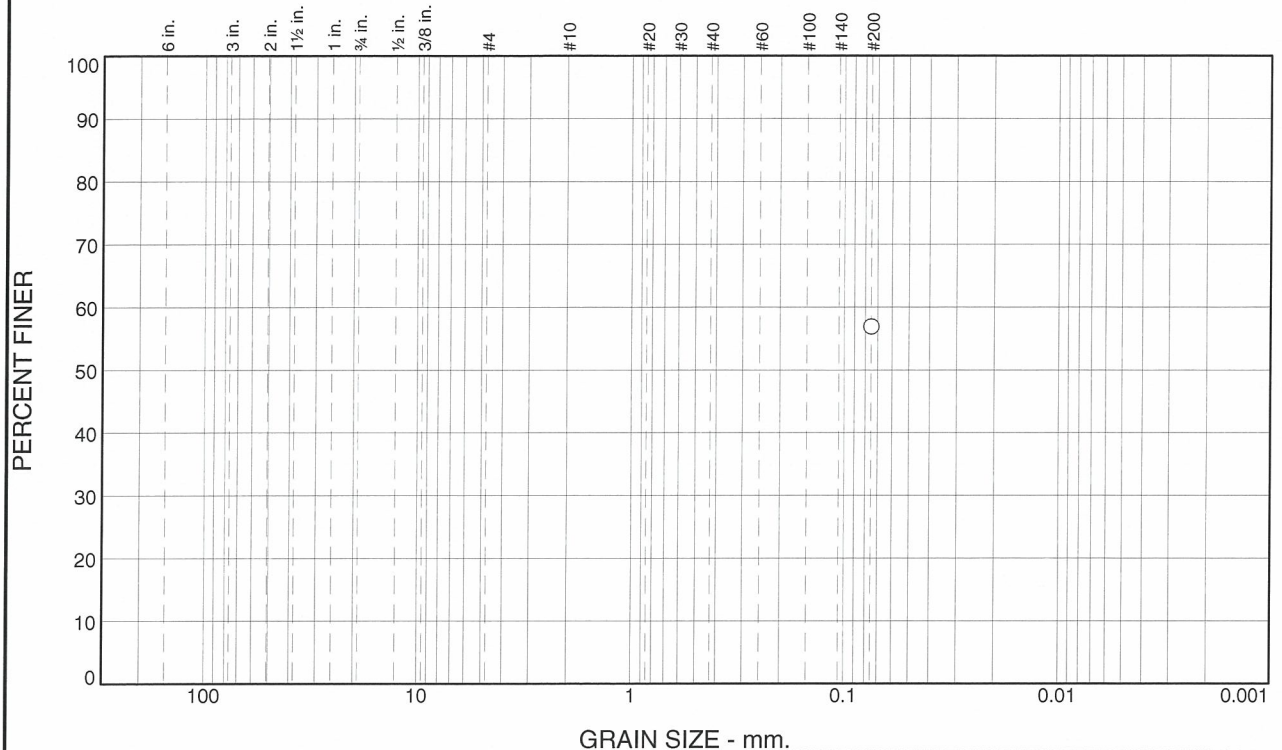**Client:** URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
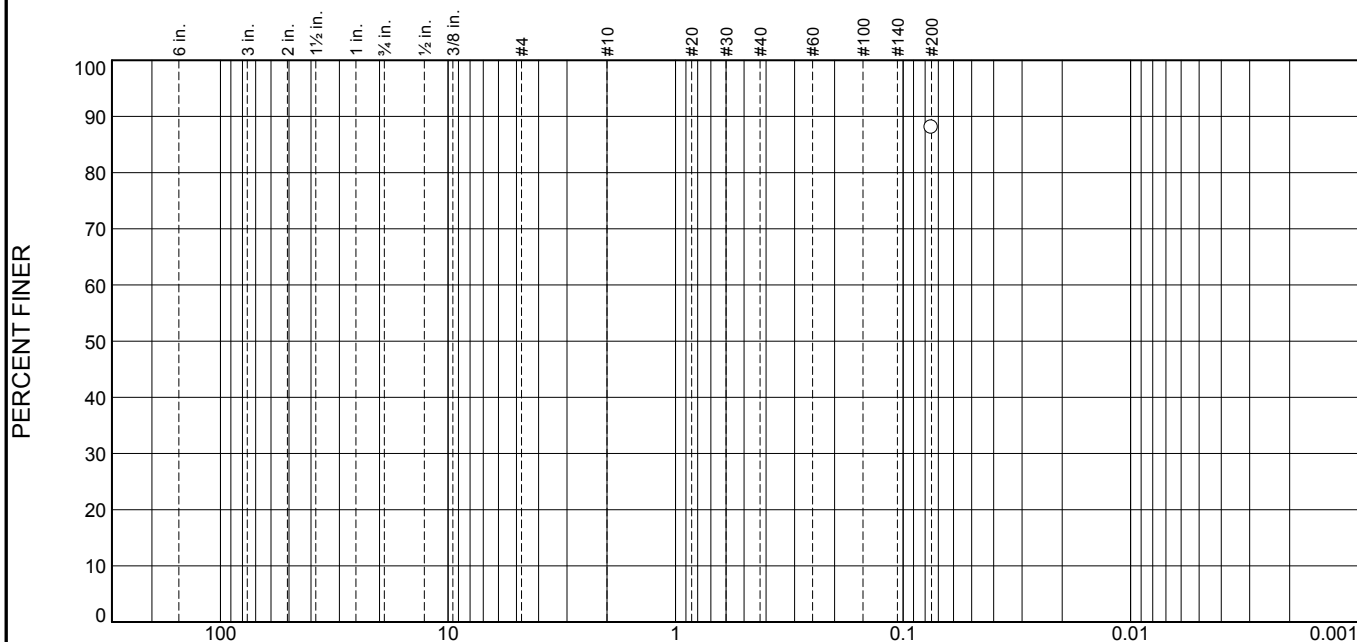
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.0	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	88.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= 23   **LL=** 38   **PI=** 15

Classification
USCS (D 2487)=   **AASHTO (M 145)=**

Coefficients
D90=   **D85=**   **D60=**
D50=   **D30=**   **D15=**
D10=   **Cu=**   **Cc=**

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0016R, S25

Sample Number: S36301   **Depth:** 120-121.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

**Client:**   URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.

Sieve sizes (top of chart): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	51.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= LL= PI=

Classification
USCS (D 2487)= AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11 **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S26
Sample Number: S35680 **Depth:** 125-126.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111 **Figure**

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	40.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S27
Sample Number: S35681   **Depth:** 130-131.5

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						12.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	12.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL= LL= PI=

Classification
USCS (D 2487)= AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11 **Date Tested:** 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0016R, S28
Sample Number: S35682 **Depth:** 135-136.3

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111 **Figure**

Particle Size Distribution Report

PERCENT FINER

GRAIN SIZE - mm.
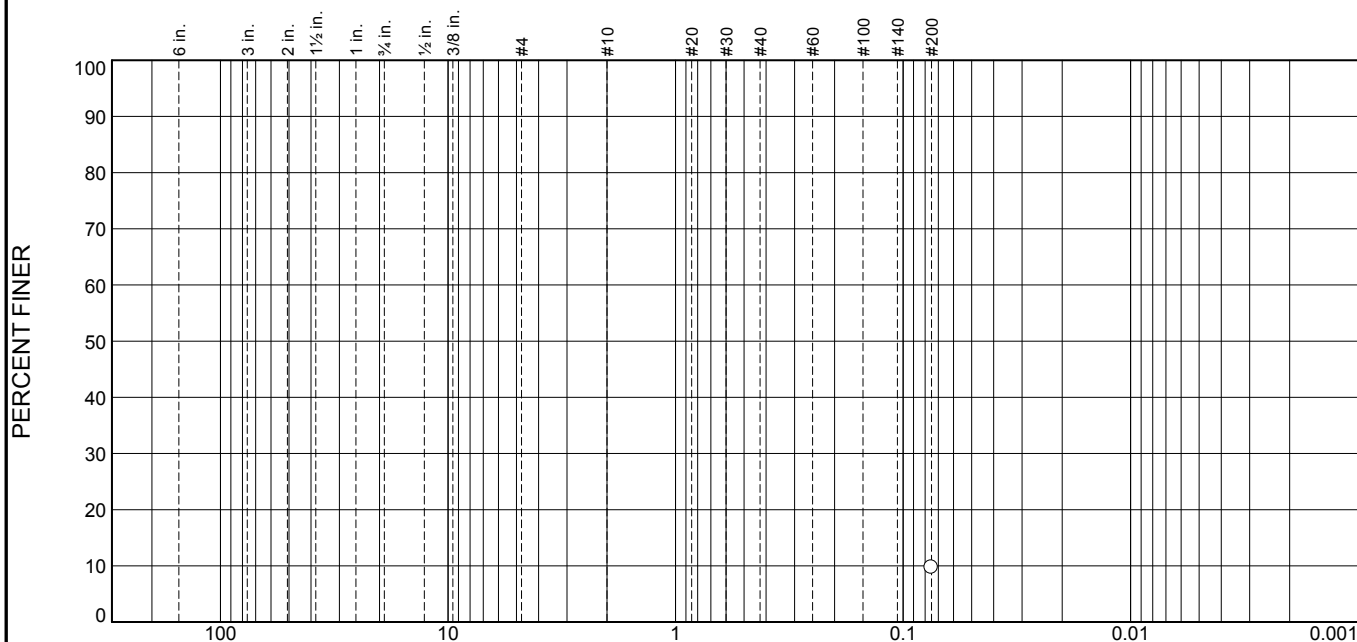
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						9.7	

TEST RESULTS					Material Description

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	9.7		

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   **Date Tested:**   11/1/11
Tested By: ac
Checked By: cw
Title: PM

* (no specification provided)

Location: S0016R, S29
Sample Number: S35683   **Depth:** 140-141.2

Date Sampled:

SIERRA TESTING LABS, INC.
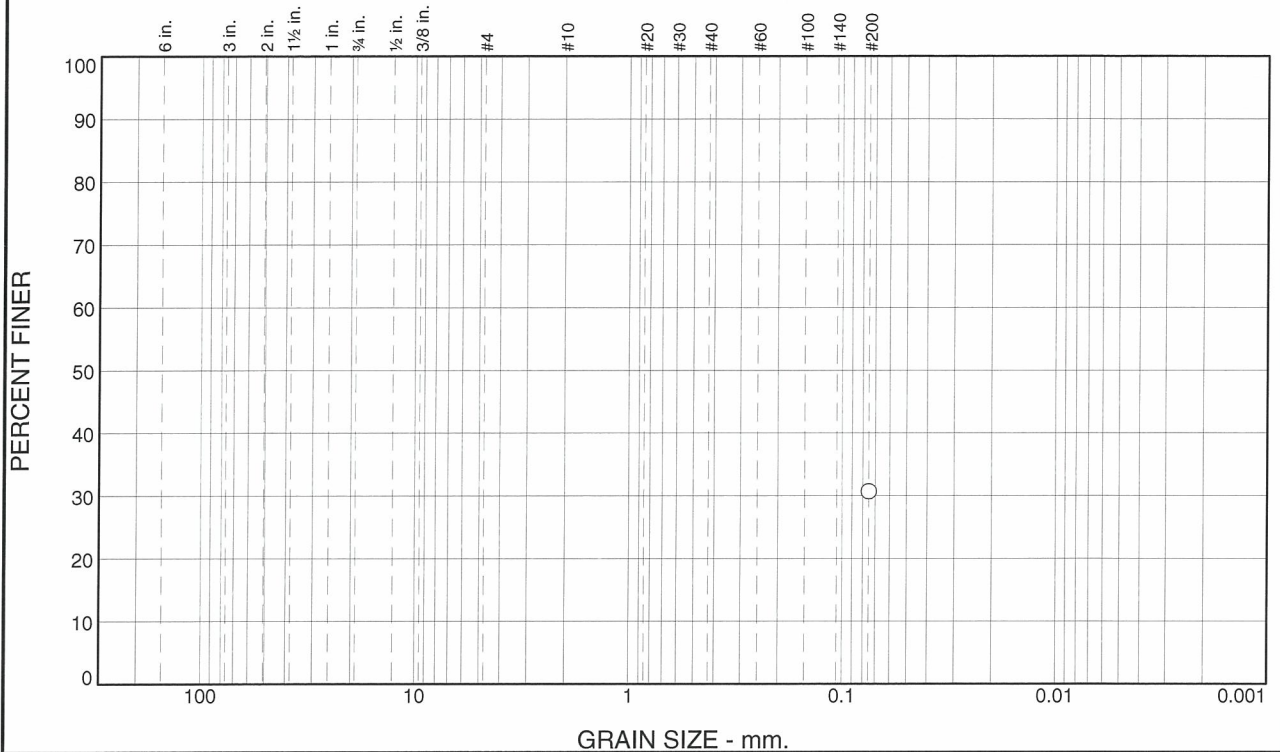## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

PERCENT FINER

Grain size markers (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						20.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	20.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　　$D_{85}=$　　　　　$D_{60}=$
$D_{50}=$　　　　　$D_{30}=$　　　　　$D_{15}=$
$D_{10}=$　　　　　$C_u=$　　　　　$C_c=$

Remarks

Date Received: 11/16/11　　**Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0016R, S31

Sample Number: S36302　　**Depth:** 150-151.5

Date Sampled:

SIERRA TESTING LABS, INC.
### El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111　　**Figure**

Particle Size Distribution Report

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						43.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	43.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S01
Sample Number: S36303   Depth: 0-5.0

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

| Grain Size markers (top axis) |
| 6 in. 3 in. 2 in. 1½ in. 1 in. ¾ in. ½ in. 3/8 in. #4 #10 #20 #30 #40 #60 #100 #140 #200 |

PERCENT FINER (y-axis: 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	64.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S02
Sample Number: S36304   Depth: 5-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
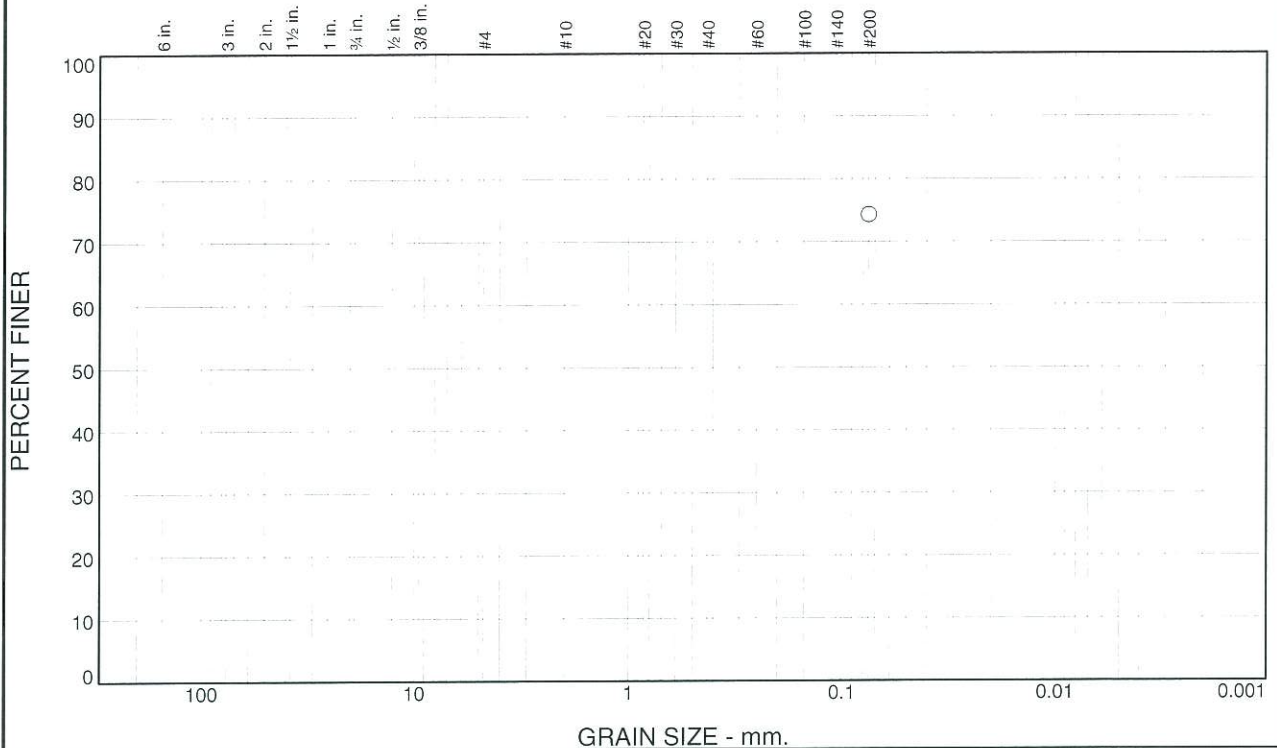
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	74.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R. S04A
Sample Number: S35684   Depth: 15-15.6

Date Sampled:

SIERRA
TESTING LABS, INC.
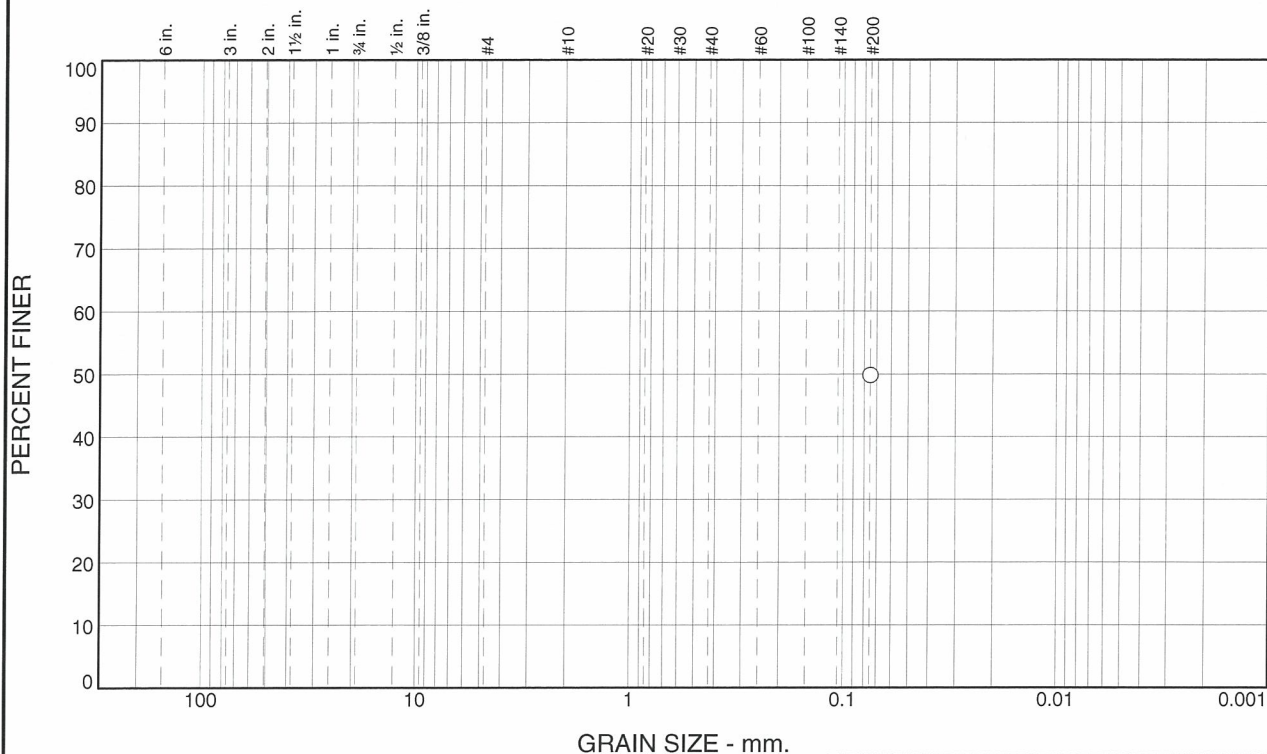## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
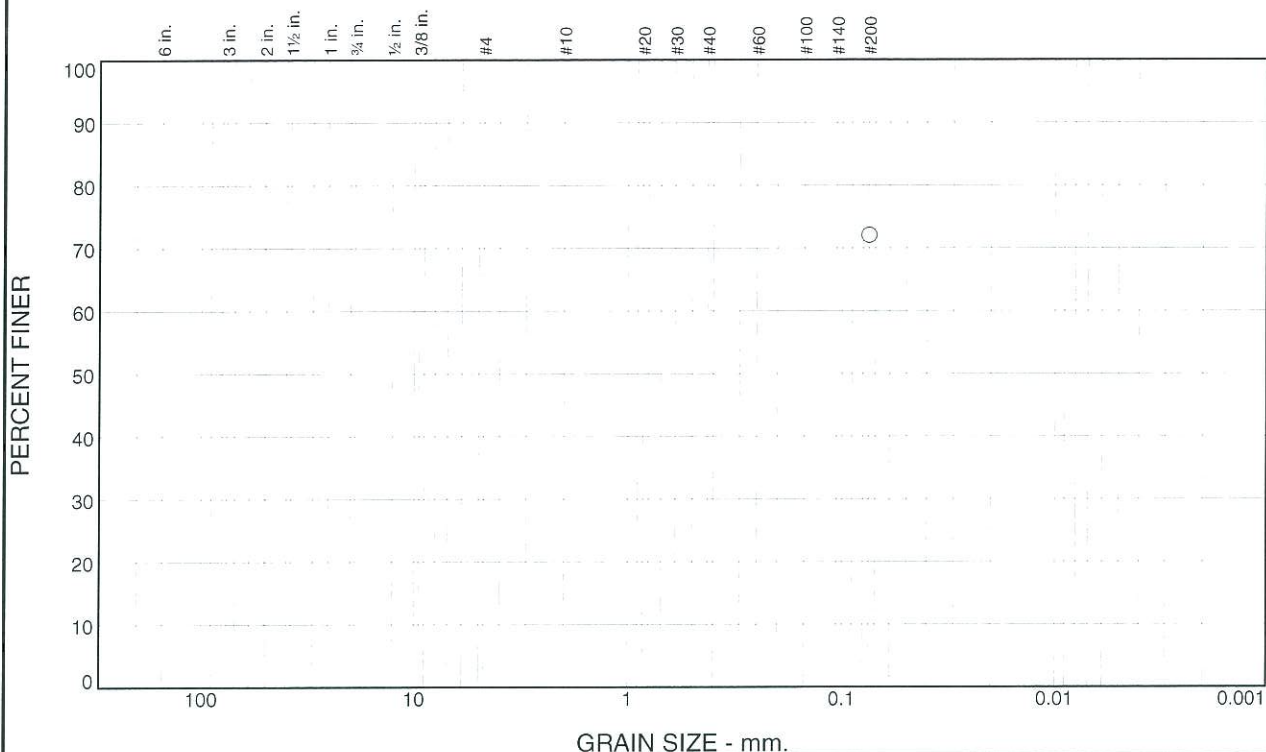
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						72.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	72.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R, S05

Sample Number: S35685   Depth: 20-21.2

Date Sampled:

**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
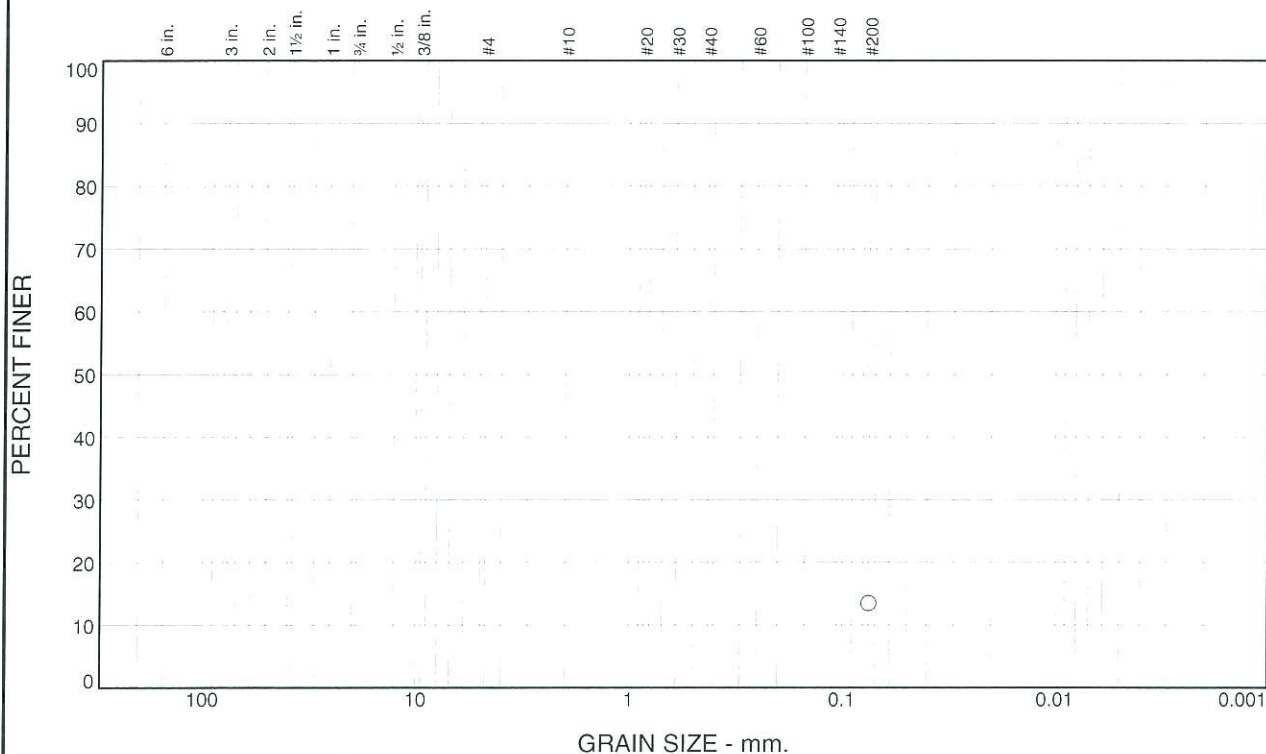
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						13.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	13.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S06
Sample Number: S36305   Depth: 25-26.0

Date Sampled:

SIERRA
TESTING LABS, INC.
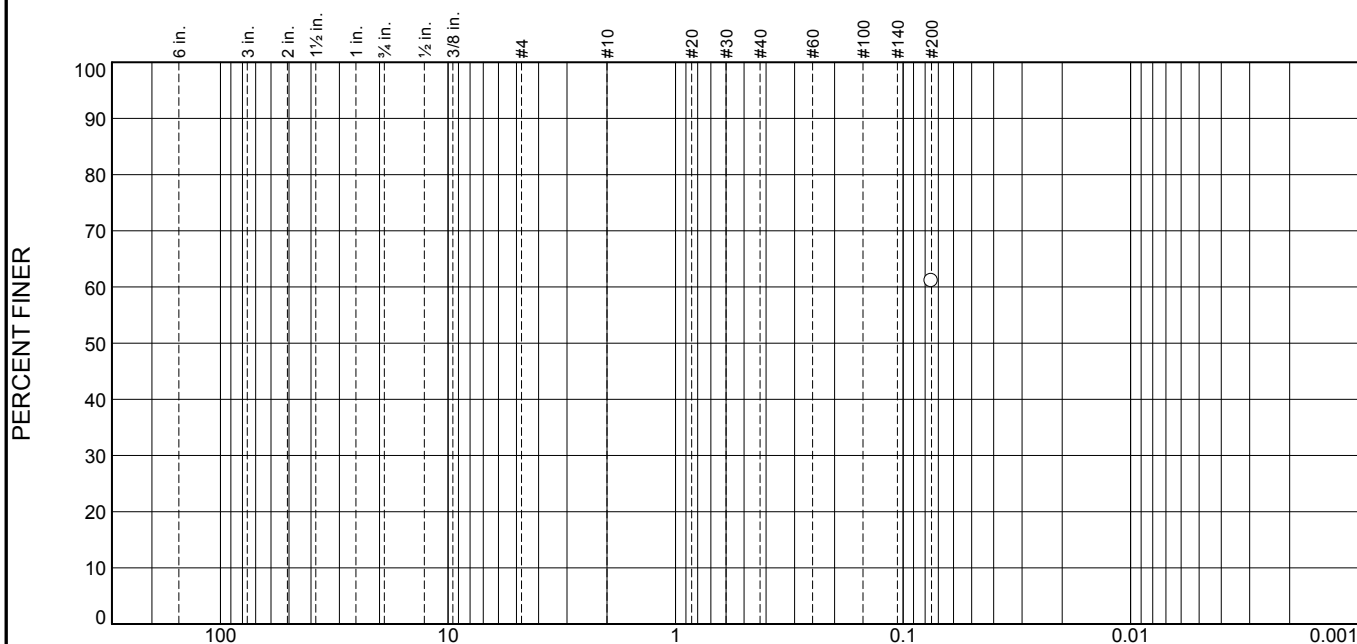## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
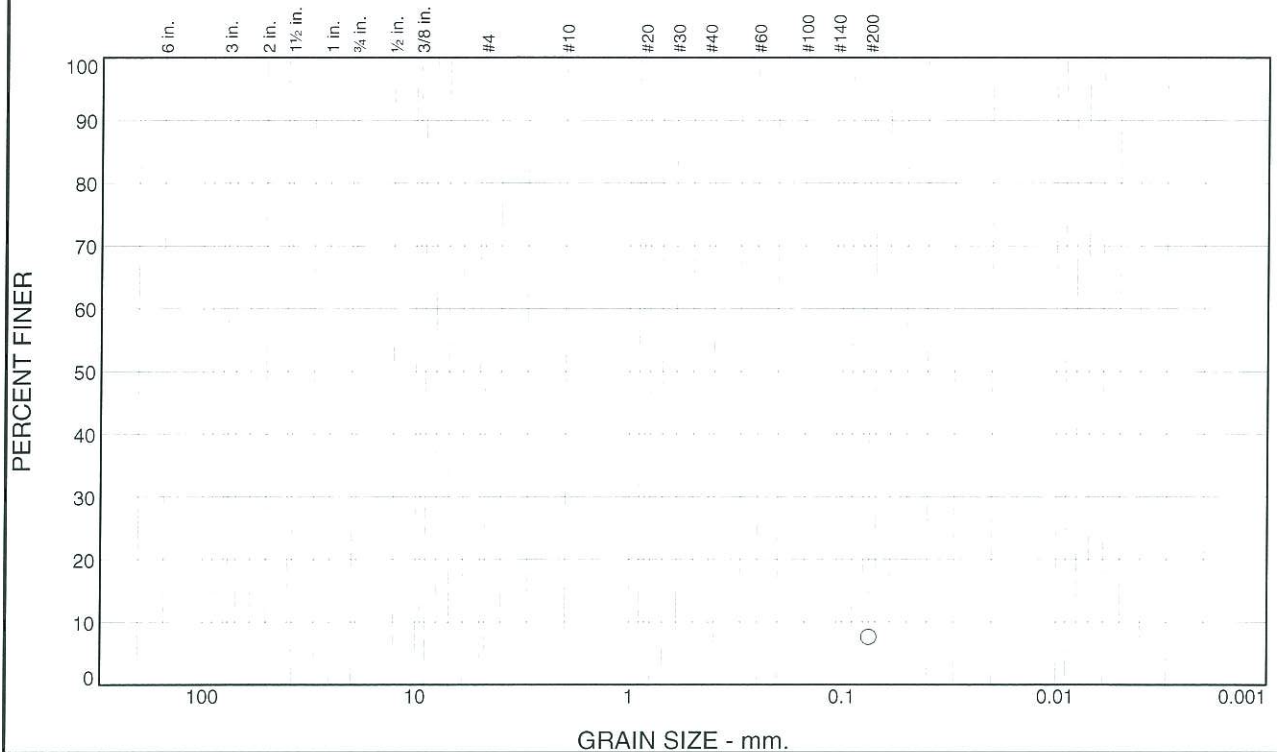
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	7.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0017R. S07
Sample Number: S36306   Depth: 30-31.3   Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	62.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0017R, S09
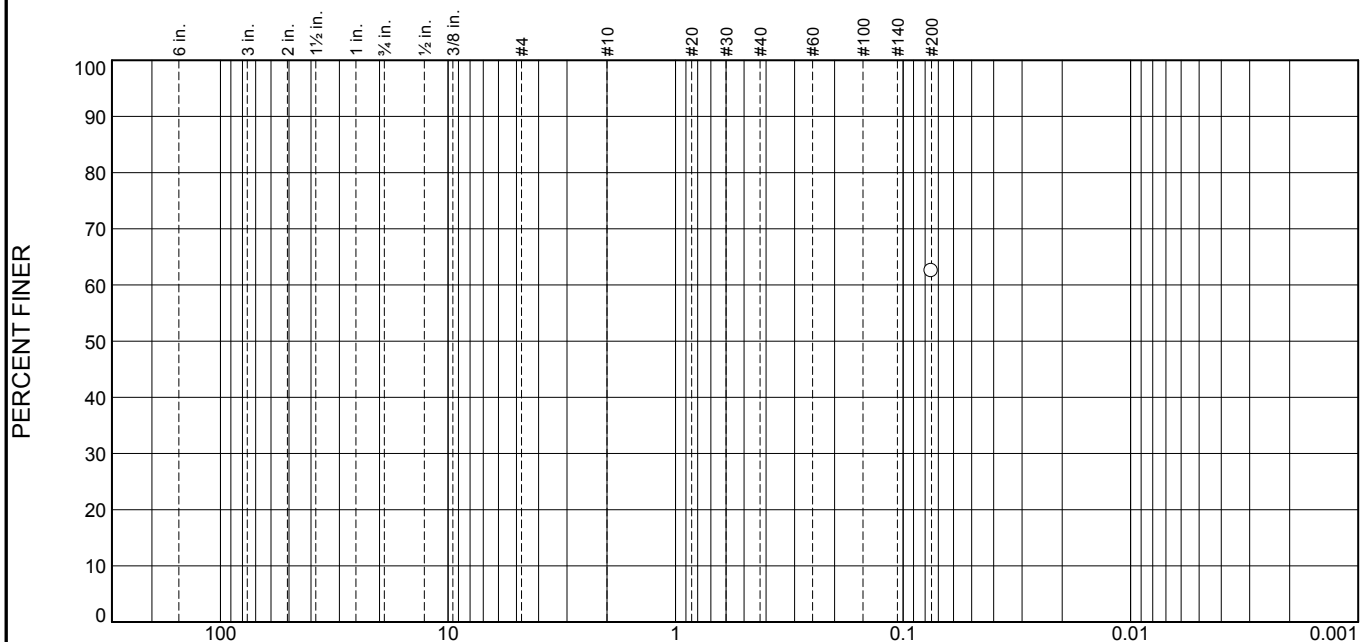Sample Number: S35686   Depth: 40-40.7

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
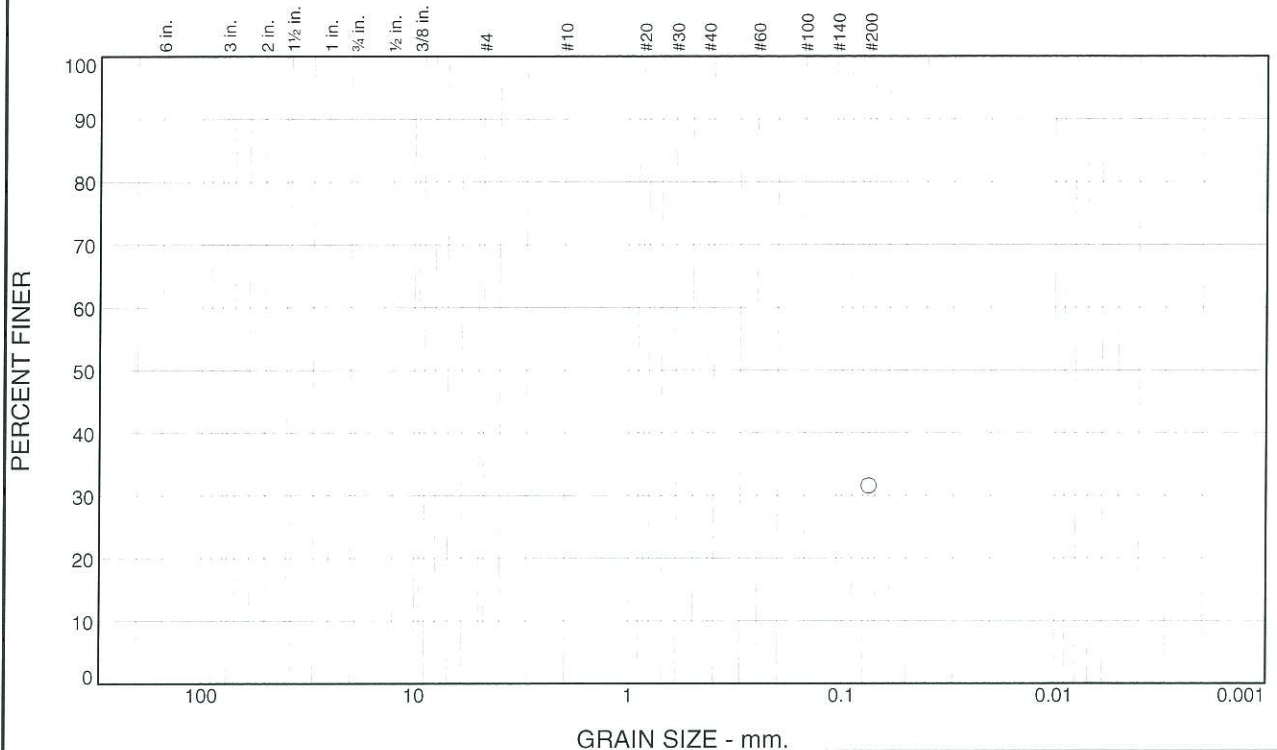
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						31.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	31.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: Date Tested:

Tested By: _____

Checked By: _____

Title: _____

Location: S0017R. S10
Sample Number: S36307   Depth: 45-46.0

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER vs GRAIN SIZE - mm.

Sieve sizes (top axis): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	46.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R, S11
Sample Number: S35687   Depth: 50-50.5

Date Sampled:

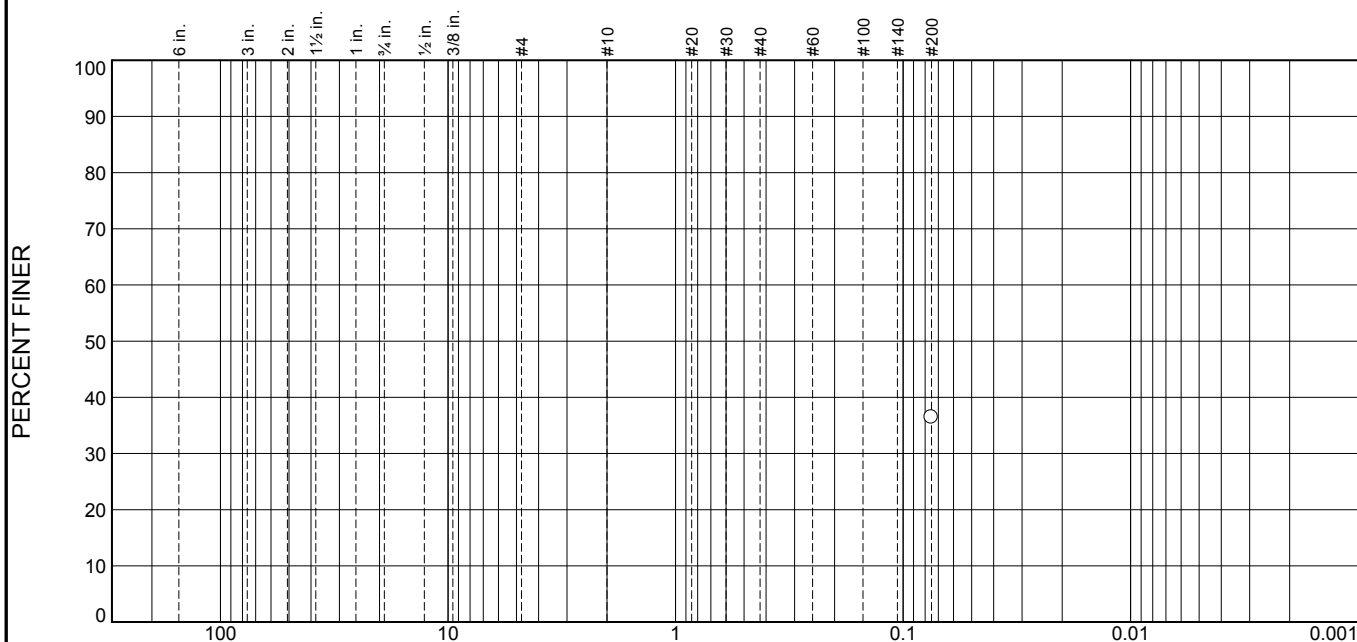## SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

| | | 6 in. | 3 in. | 2 in. | 1½ in. | 1 in. | ¾ in. | ½ in. | 3/8 in. | #4 | #10 | #20 | #30 | #40 | #60 | #100 | #140 | #200 |

PERCENT FINER (y-axis: 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						22.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	22.3		

(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S12
Sample Number: S36308   Depth: 55-55.7

Date Sampled:

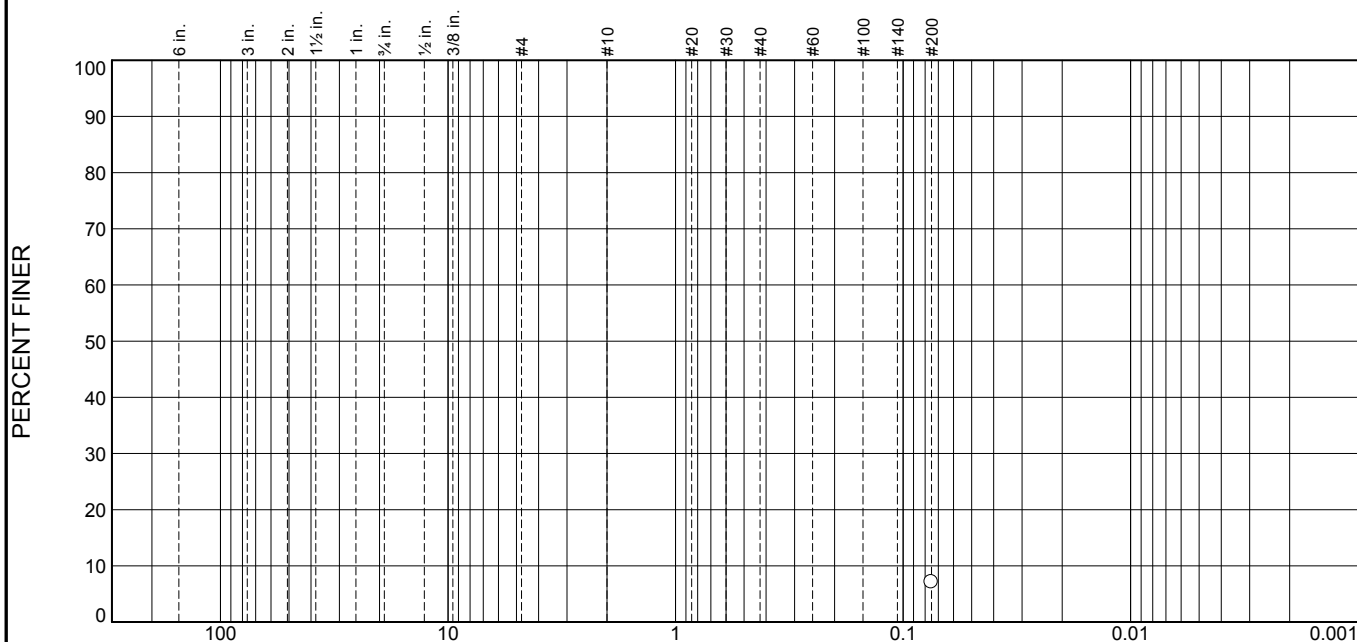## SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
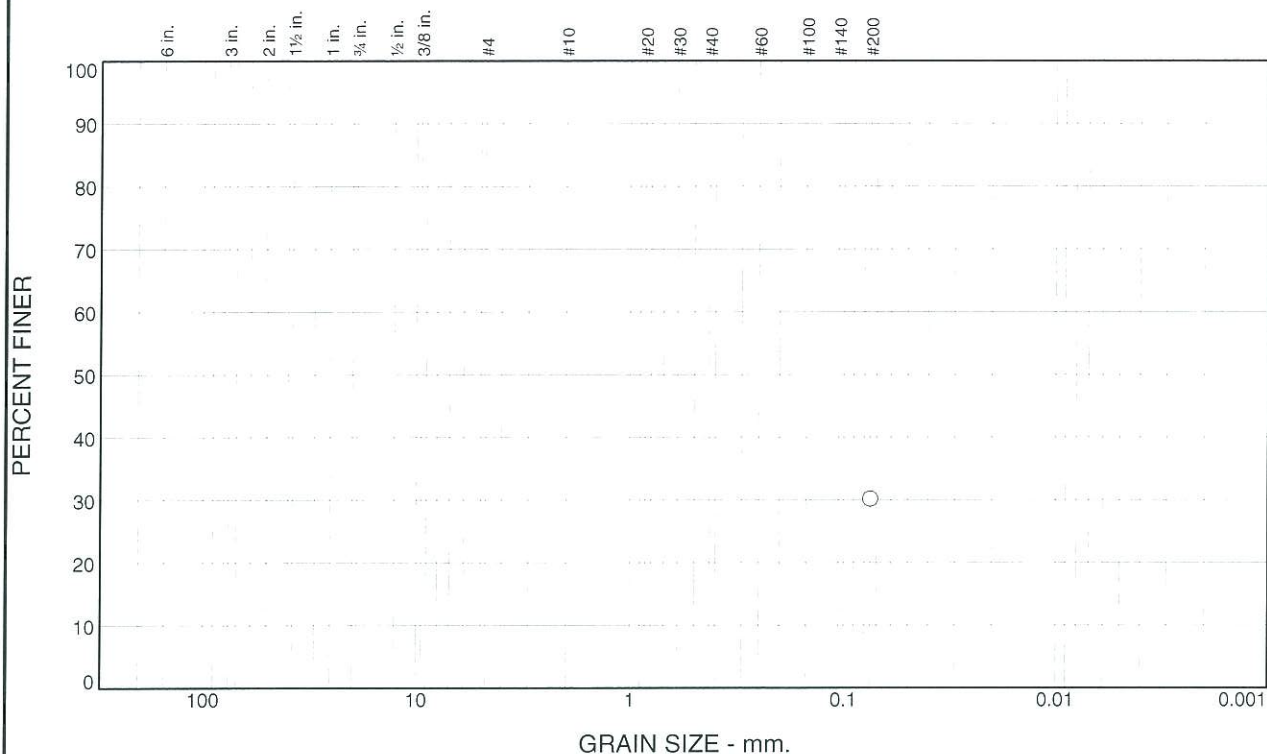
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	30.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S13
Sample Number: S36309   Depth: 60-61.2

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	61.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0017R, S15
Sample Number: S35688   Depth: 70-71.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
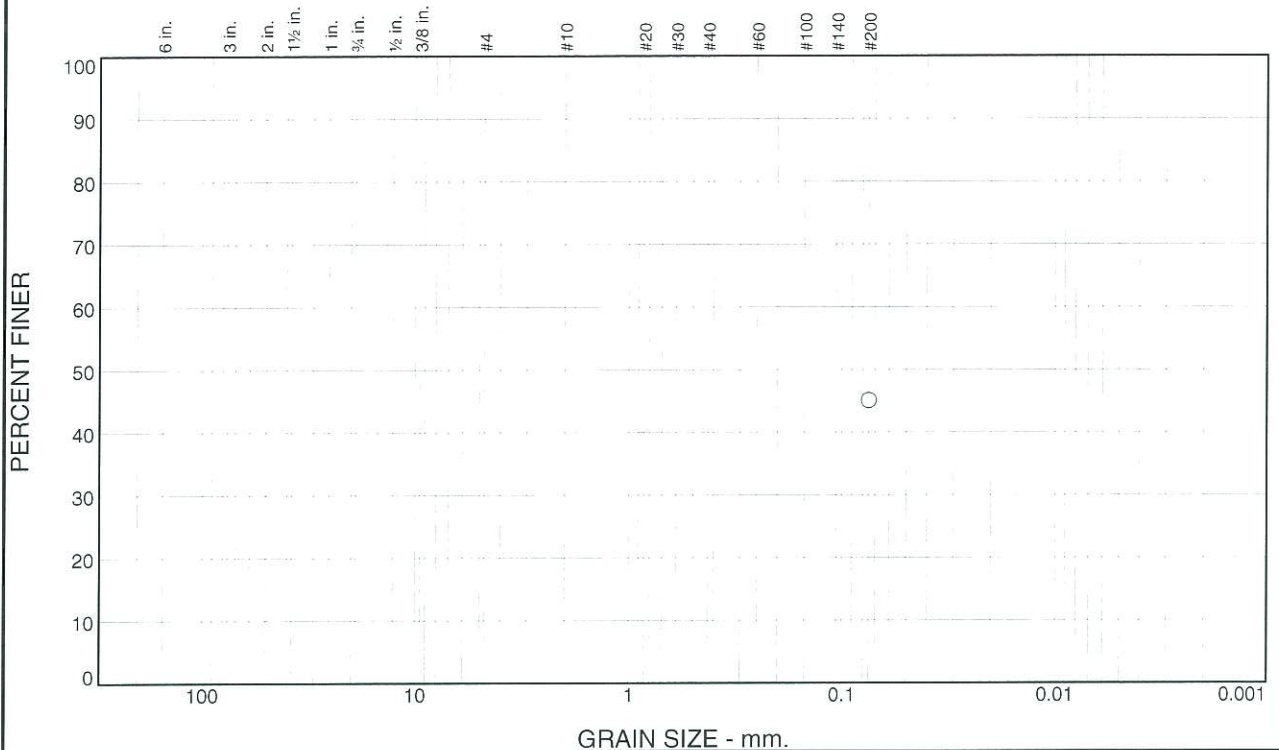
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						45.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	45.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R. S16
Sample Number: S35689   Depth: 75-76.4

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

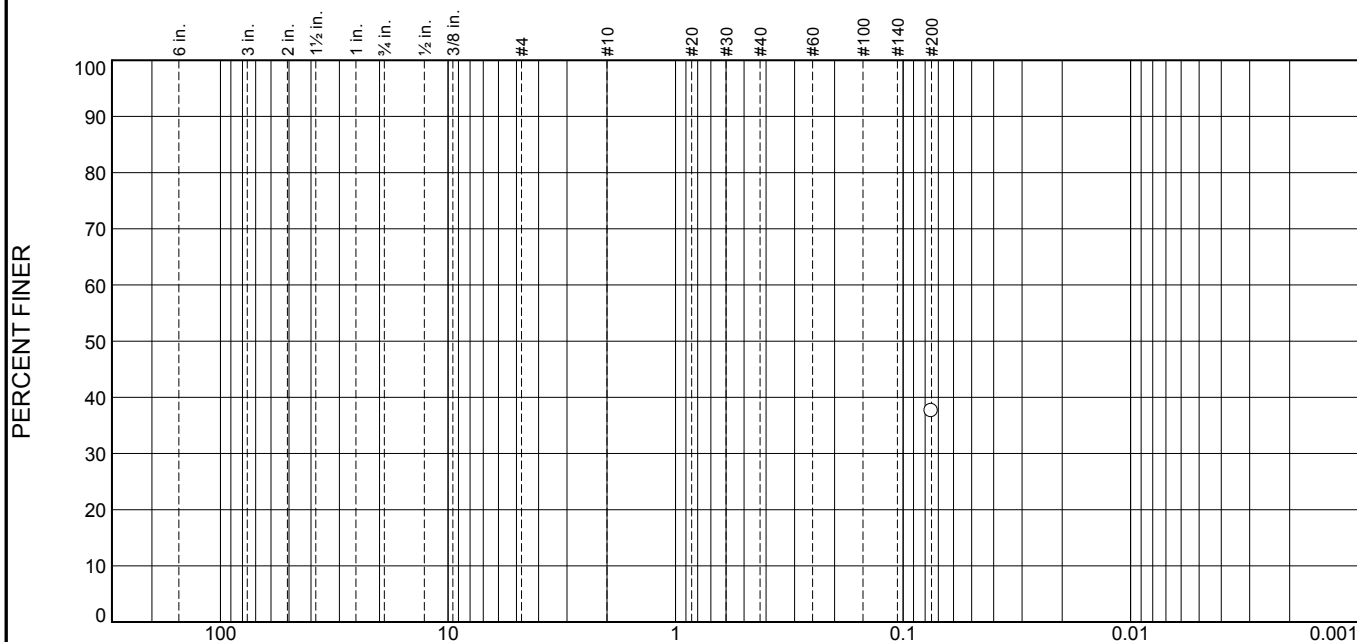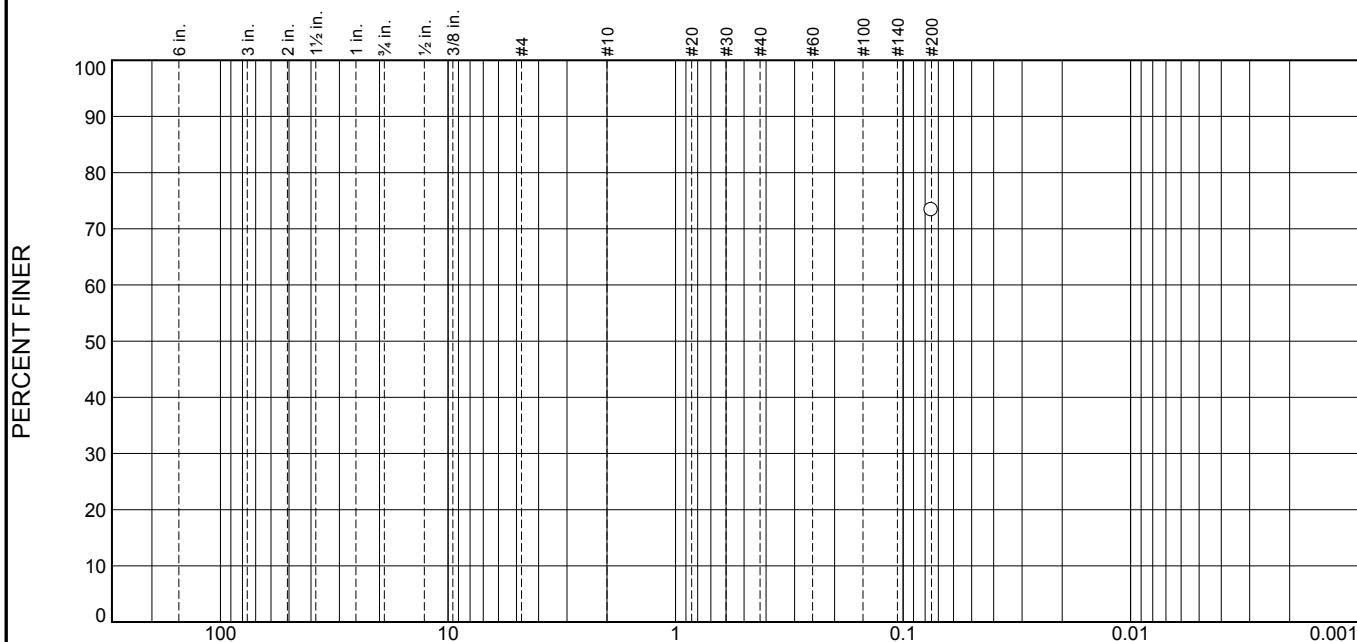Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						85.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	85.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　　LL=　　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　　AASHTO (M 145)=

Coefficients
D_{90}=　　　　D_{85}=　　　　D_{60}=
D_{50}=　　　　D_{30}=　　　　D_{15}=
D_{10}=　　　　C_u=　　　　C_c=

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R, S17A
Sample Number: S35690　　　**Depth:** 80-80.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　　　Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
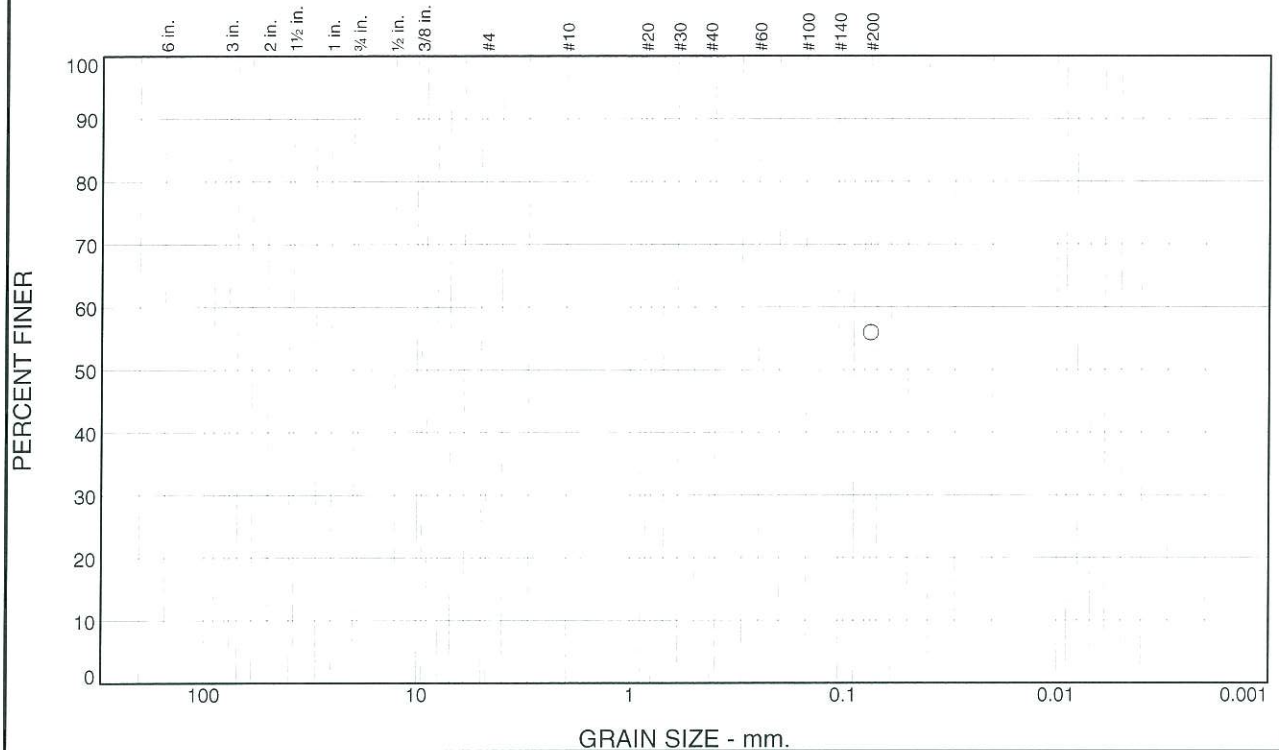
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	56.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0017R, S17B
Sample Number: S35691   Depth: 80.3-80.9

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
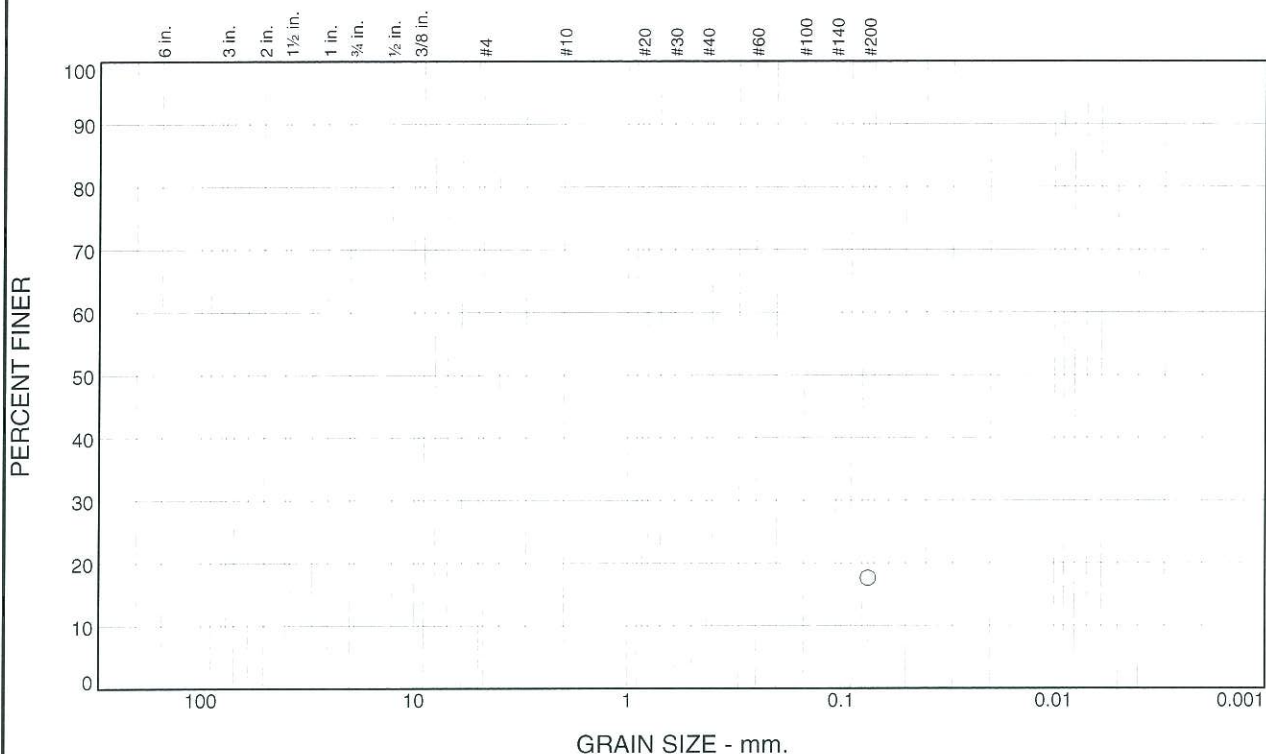
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						17.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	17.7		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　$D_{85}=$　　　$D_{60}=$
$D_{50}=$　　　$D_{30}=$　　　$D_{15}=$
$D_{10}=$　　　$C_u=$　　　$C_c=$

Remarks

Date Received: 11/16/11　　Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S18A

Sample Number: S36310　　Depth: 85-85.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111　　　Figure

Particle Size Distribution Report
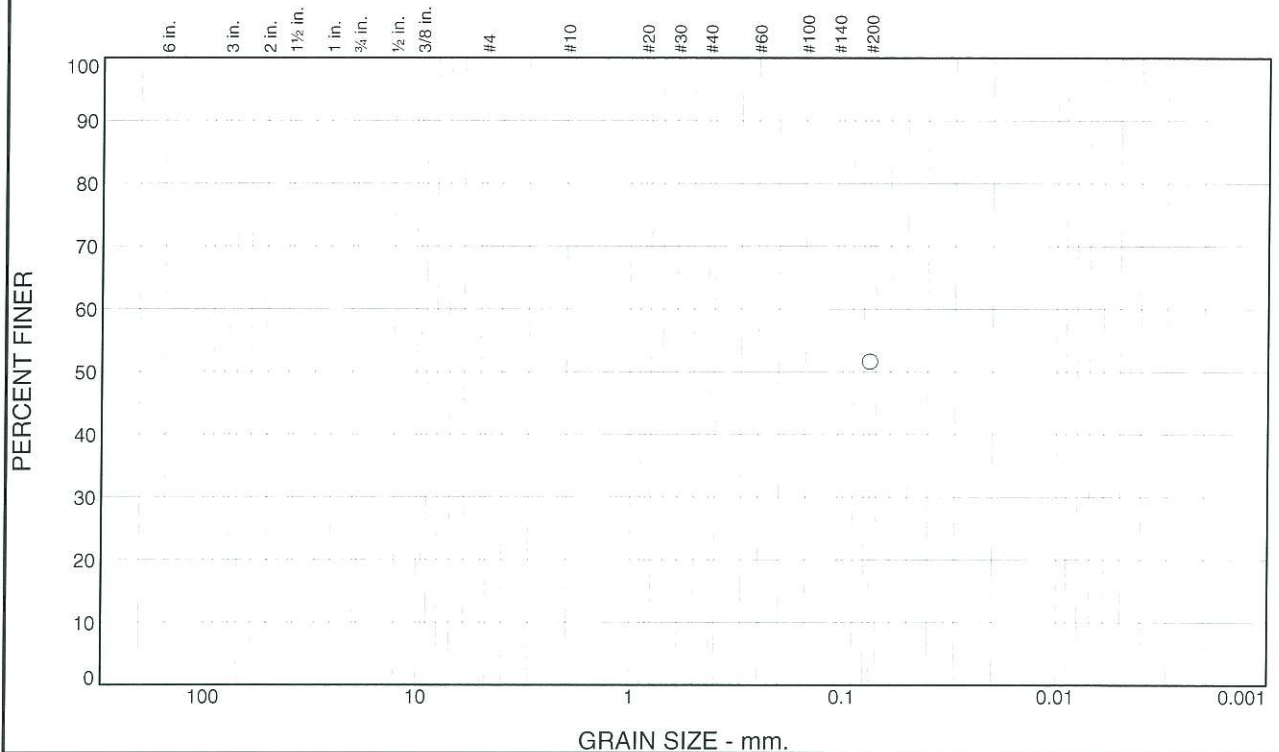
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	51.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0017R, S18B
Sample Number: S35692   Depth: 85.5-86.3

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
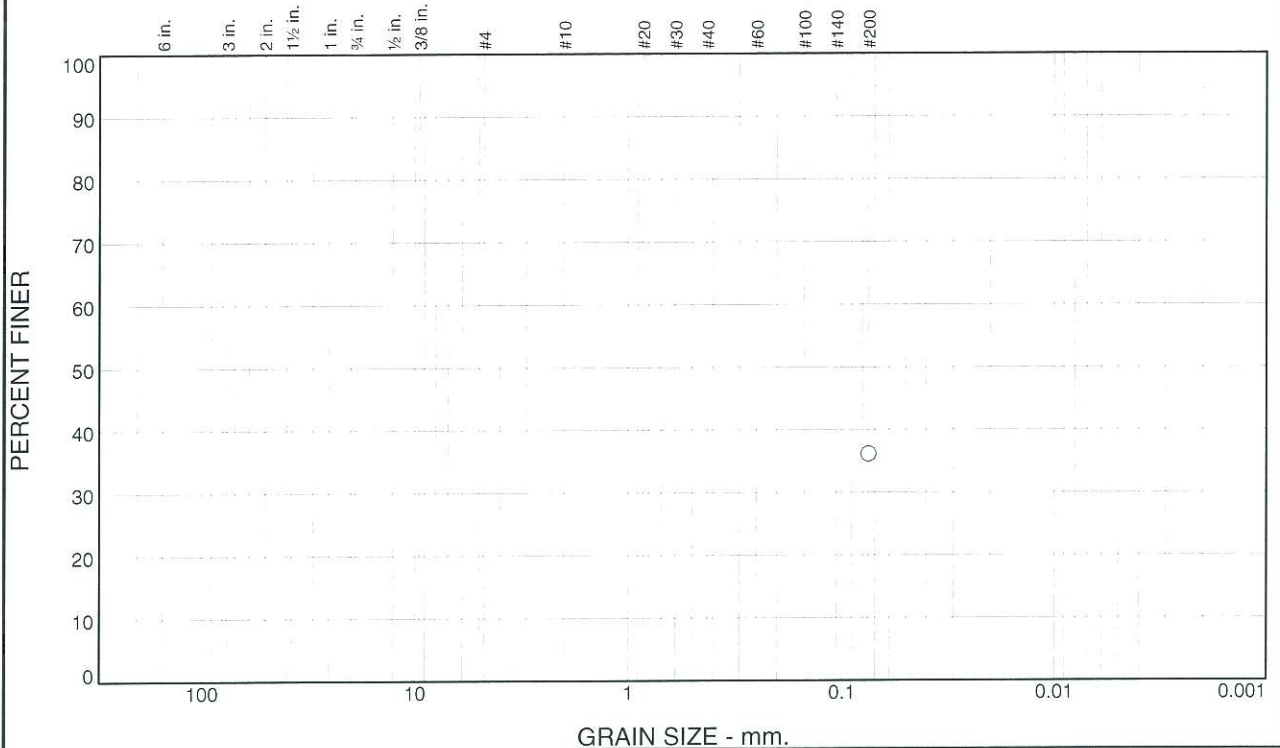
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						36.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	36.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R, S19
Sample Number: S35693   Depth: 90-91.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA
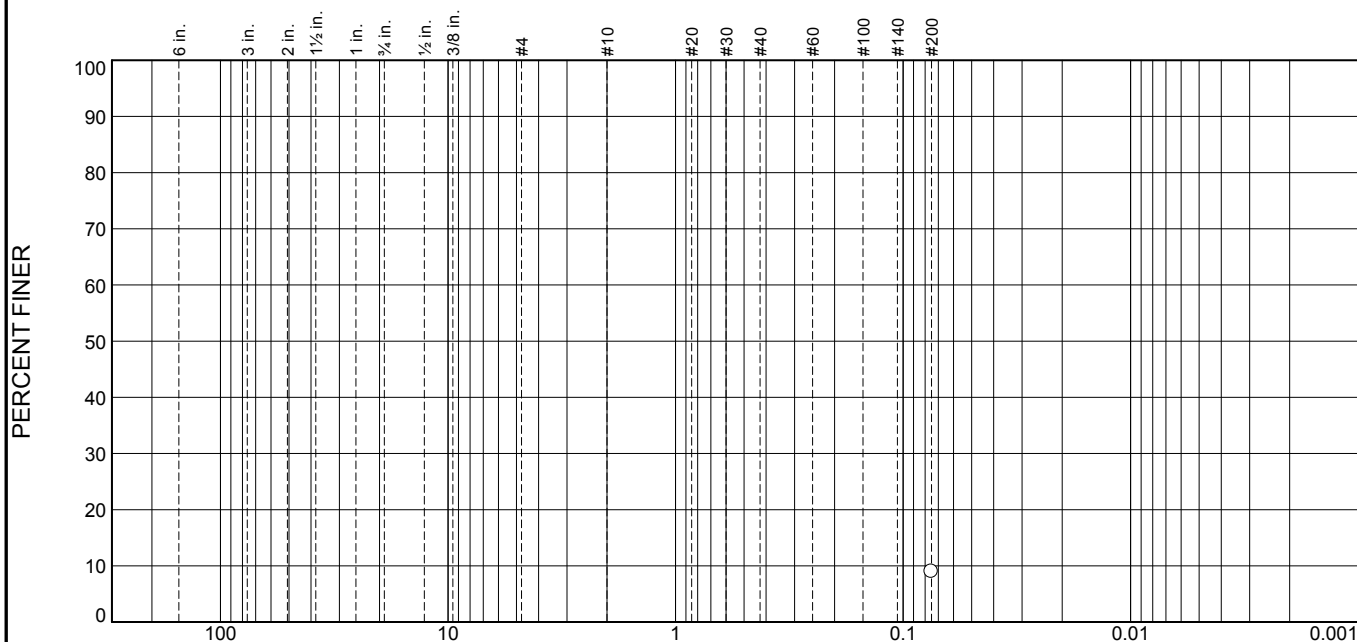
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
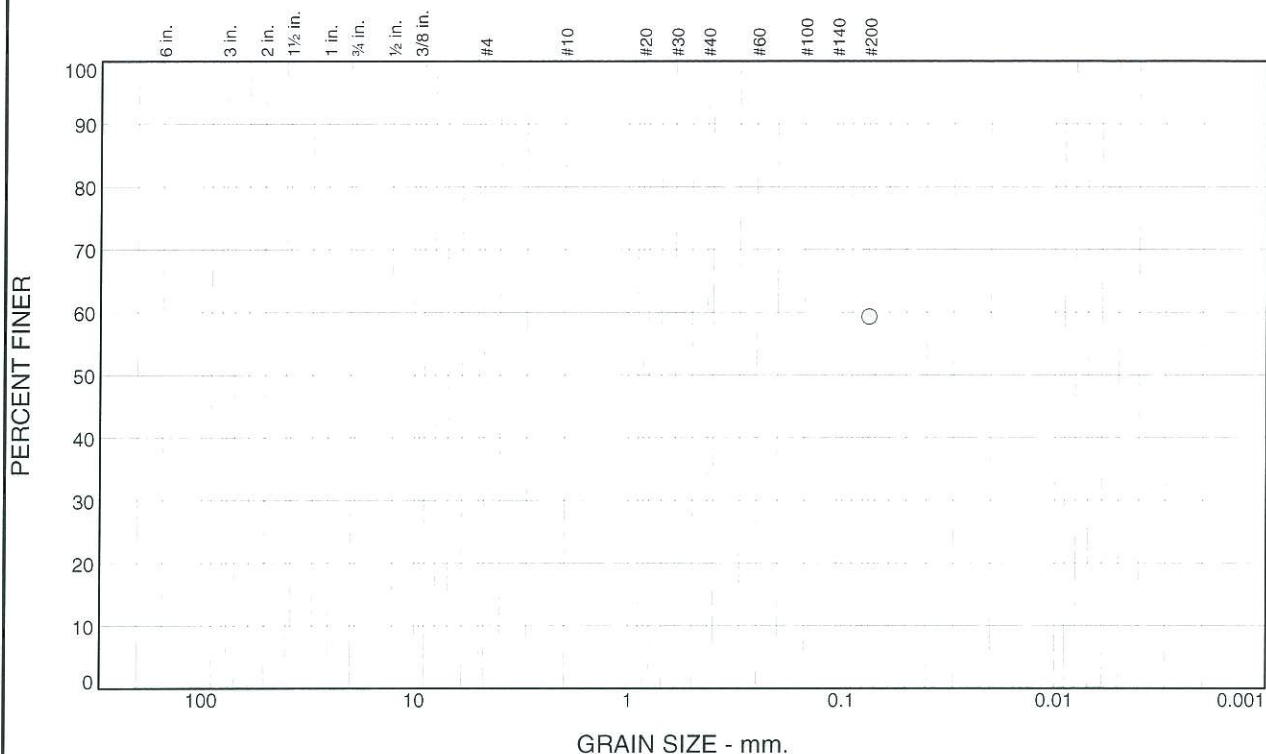
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	59.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D$_{90}$=   D$_{85}$=   D$_{60}$=
D$_{50}$=   D$_{30}$=   D$_{15}$=
D$_{10}$=   C$_u$=   C$_c$=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R, S20
Sample Number: S35694   Depth: 95-95.8

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
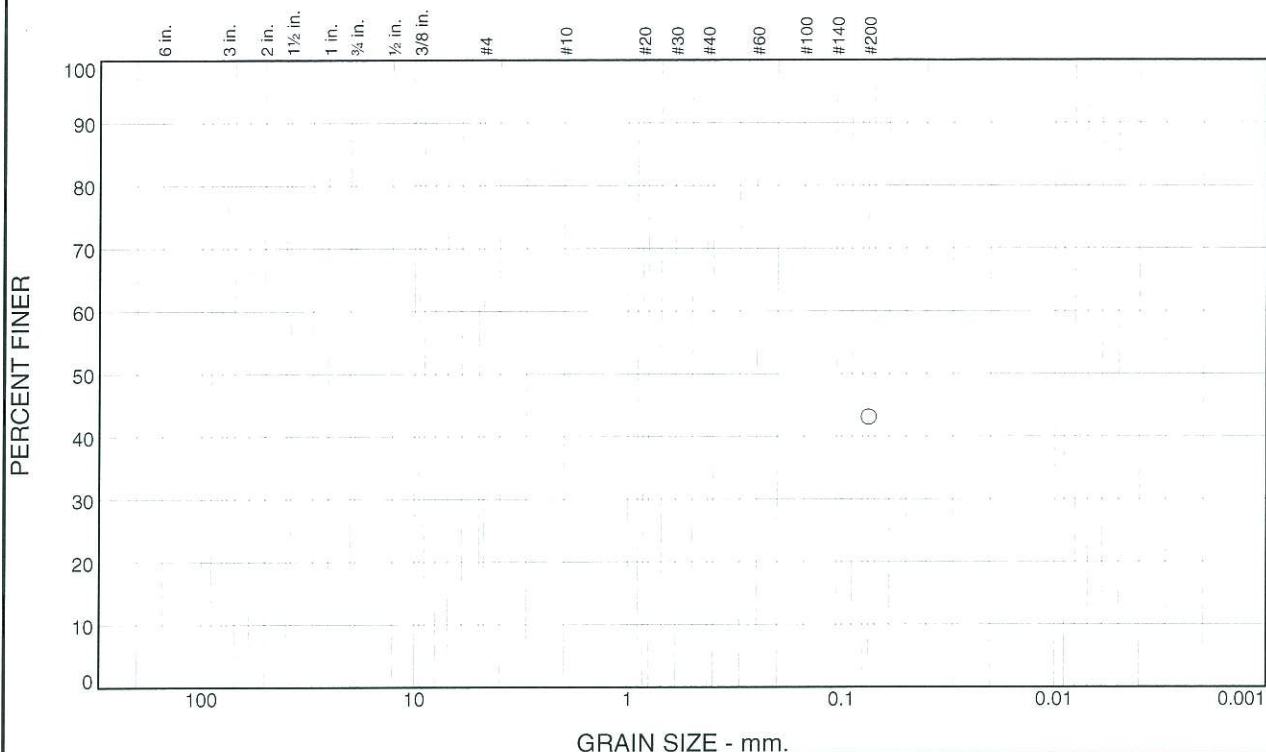
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						43.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	43.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S21
Sample Number: S36311   Depth: 100-100.9

Date Sampled:

SIERRA
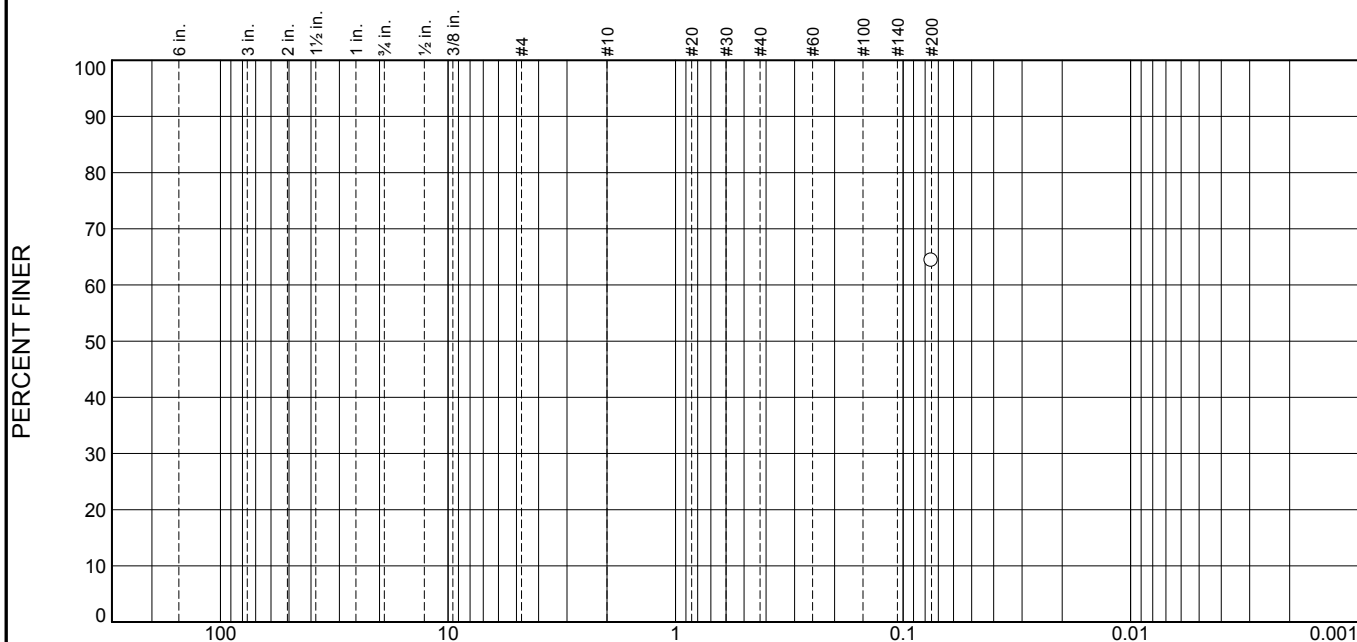## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R, S22
Sample Number: S35695   Depth: 105-106.4

Date Sampled:

SIERRA
TESTING LABS, INC.
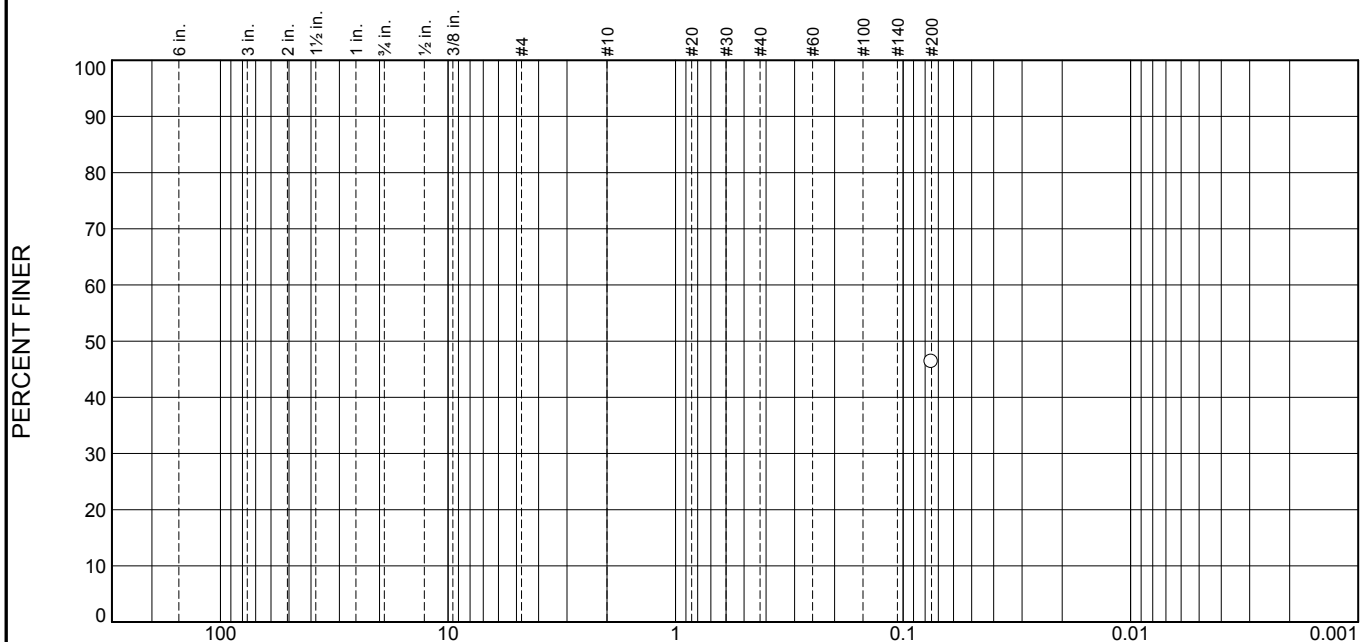## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
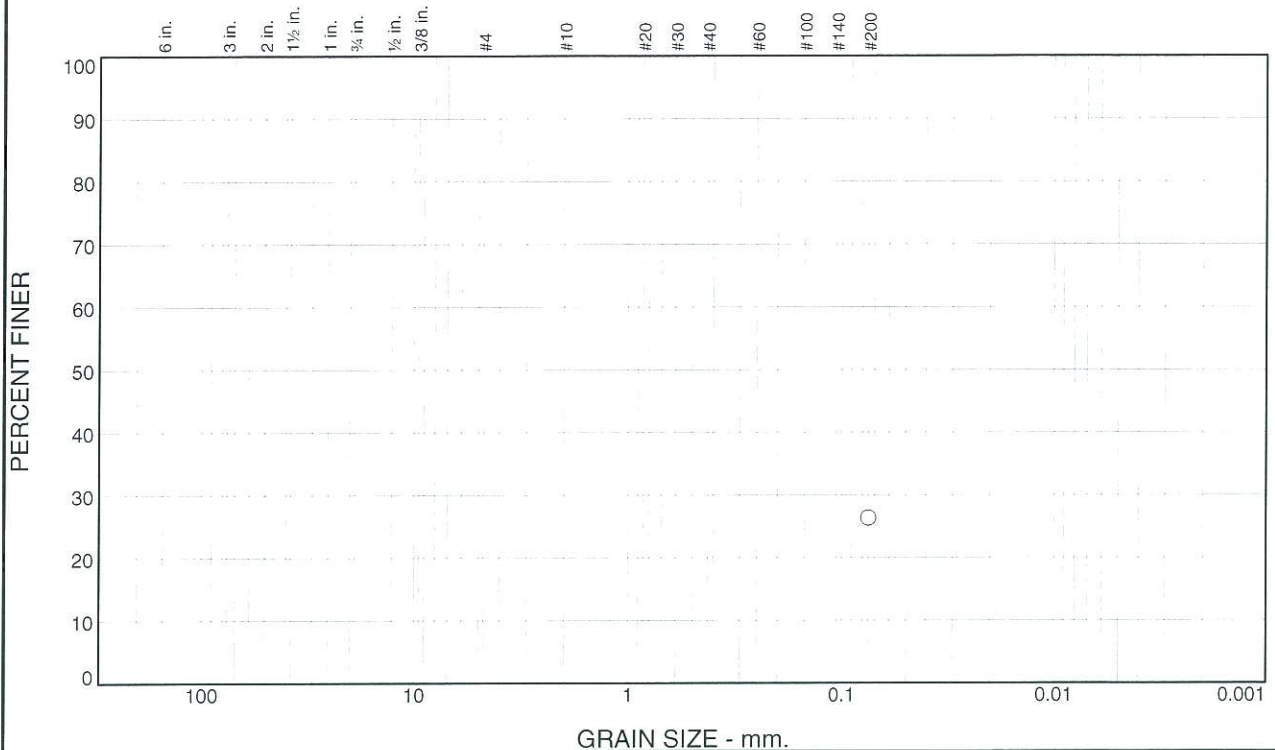
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						26.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	26.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0017R, S24
Sample Number: S36312   Depth: 115-116.3
Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
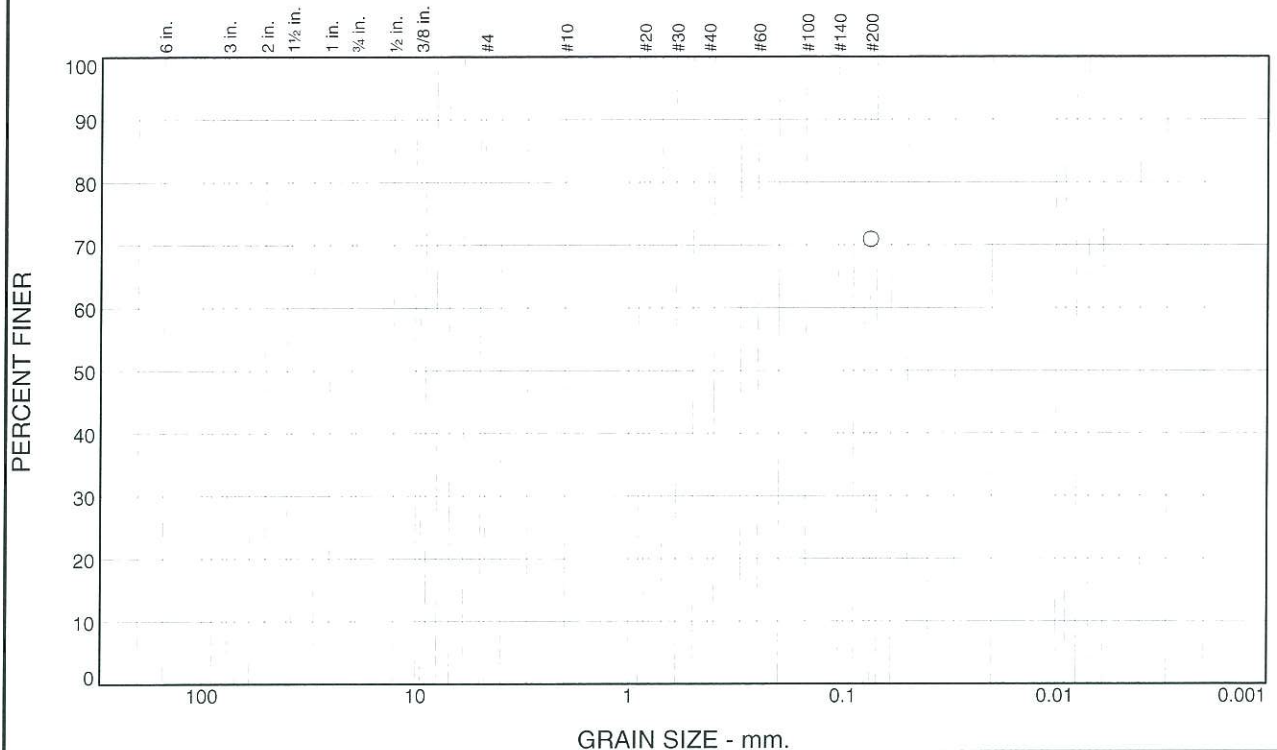
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						70.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	70.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S29A
Sample Number: S35697   Depth: 140-140.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

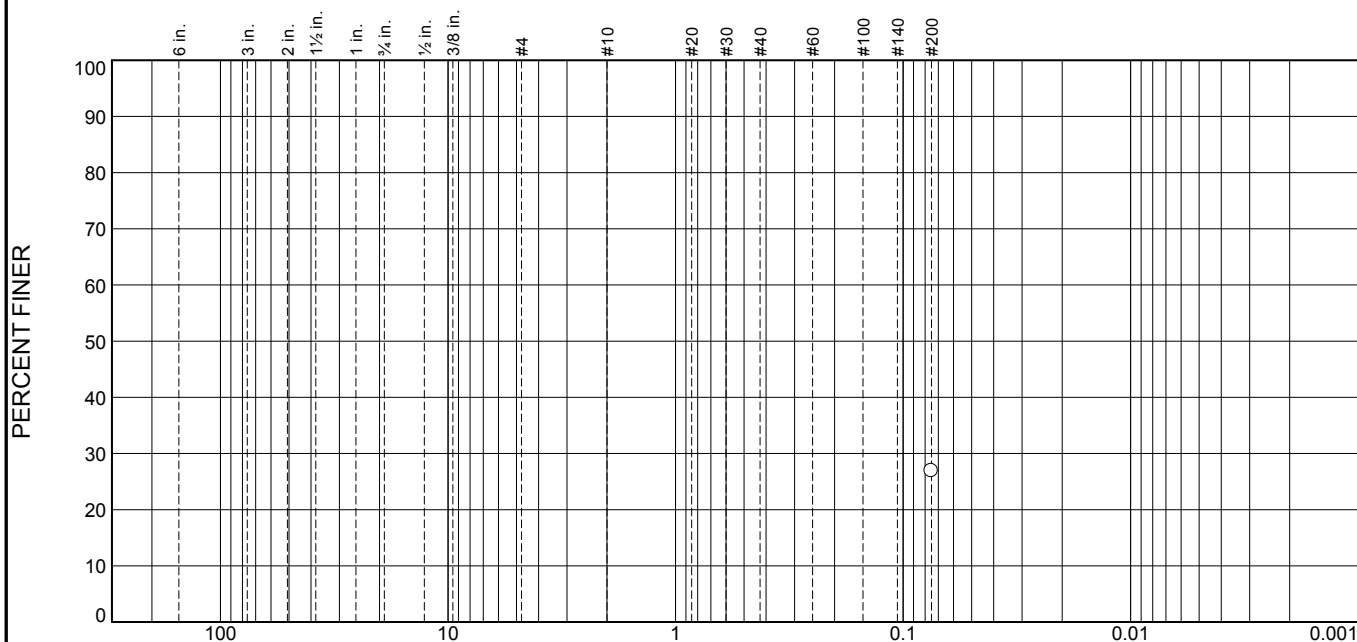Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	73.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0017R, S30
Sample Number: S36313   Depth: 145-146.0

Date Sampled:

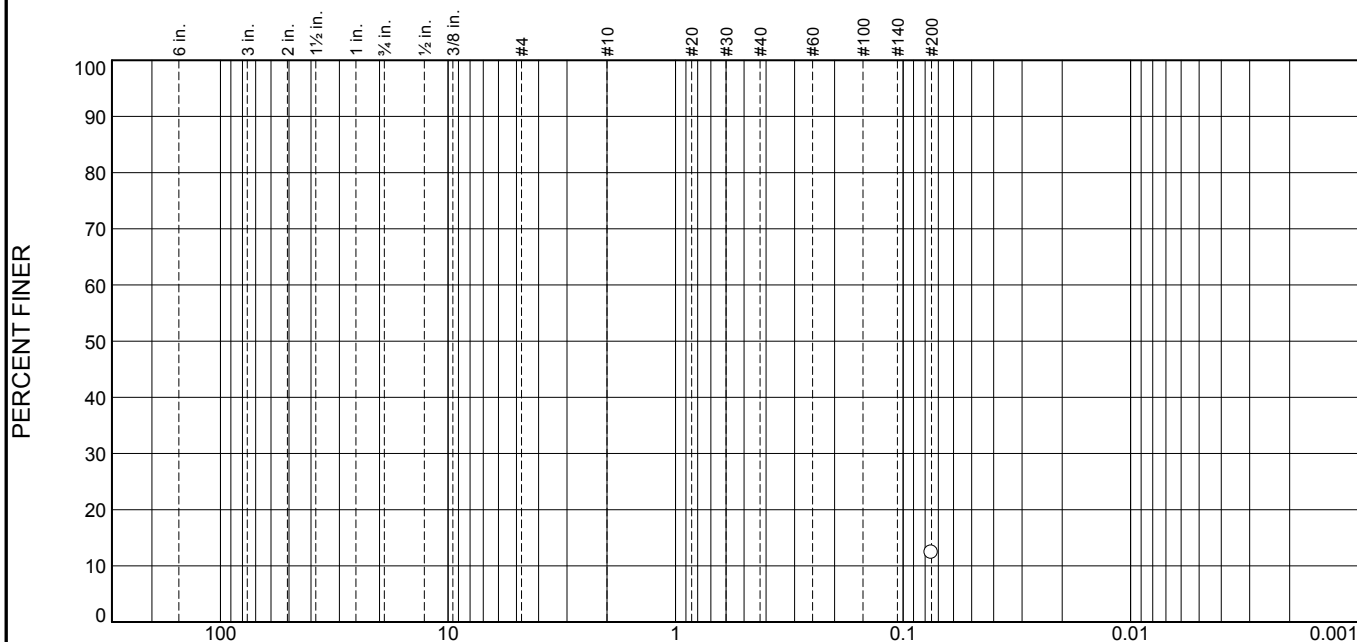## SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0017R. S31
Sample Number: S35698   Depth: 150-151.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
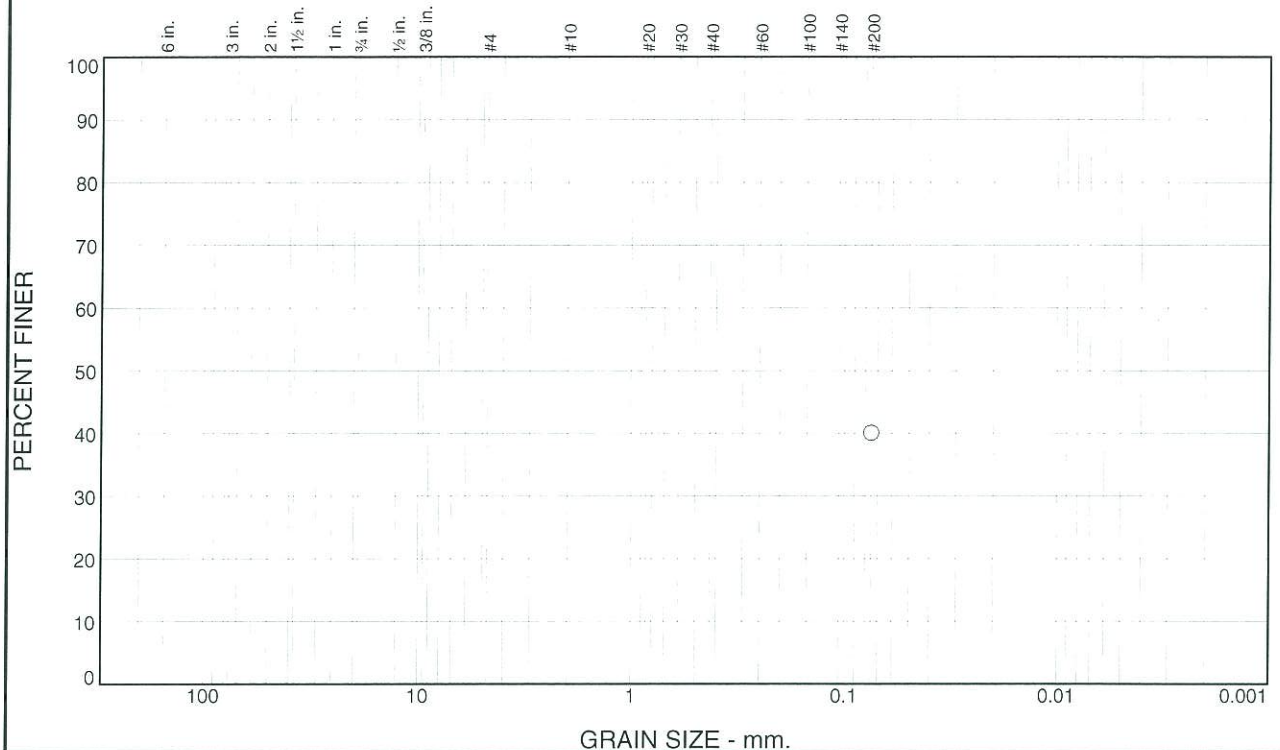
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.1	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	40.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/16/11　　Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

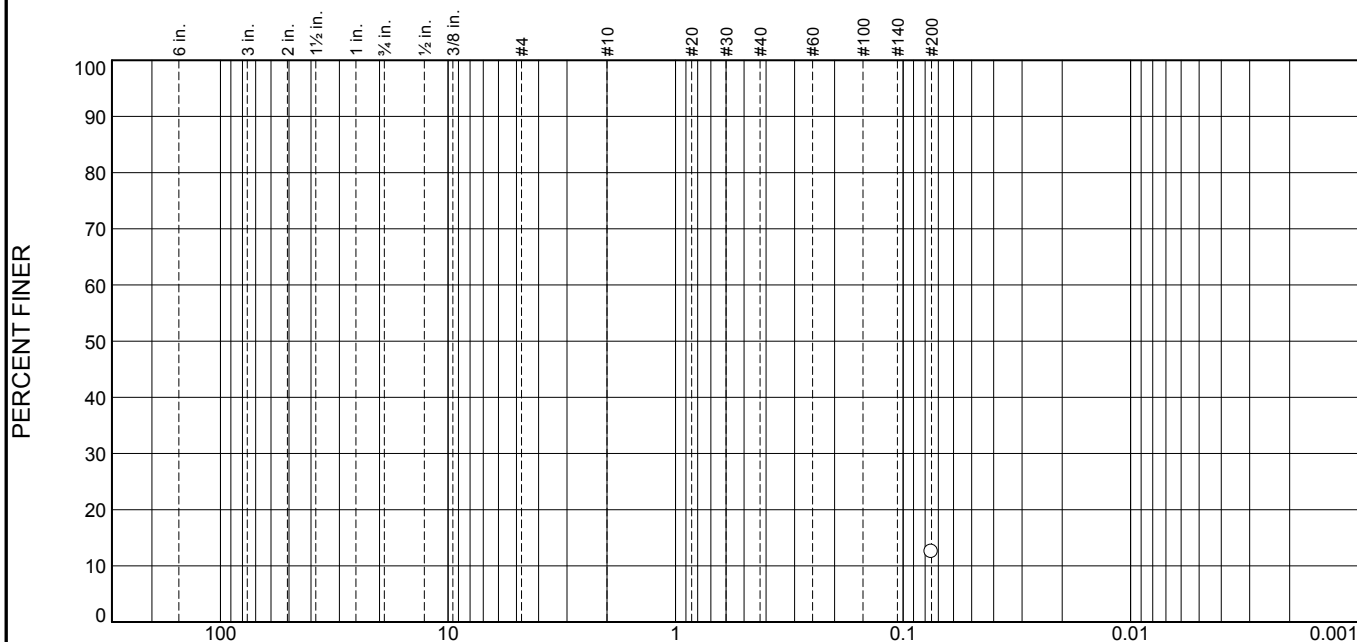Location: S0018R. S01
Sample Number: S36314　　Depth: 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM / ARUP
Project: CA High Speed Train
　　　　Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
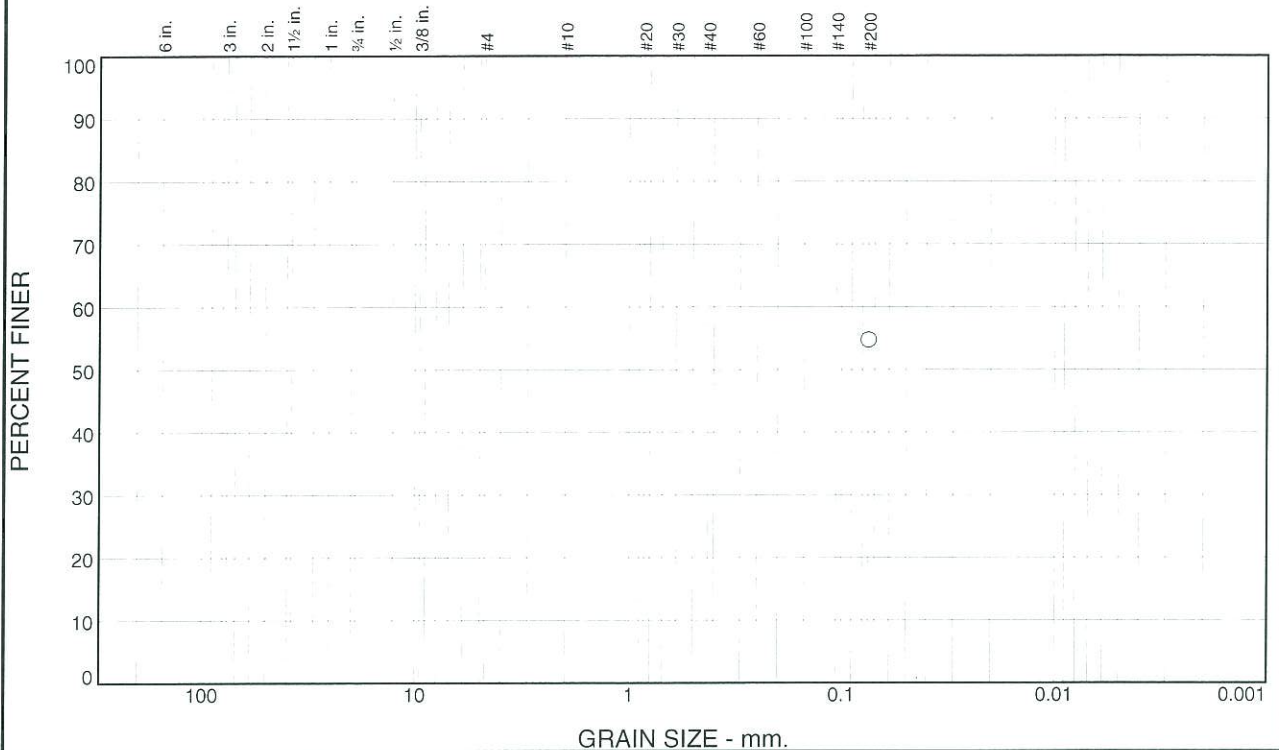
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	54.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S02
Sample Number: S36315   Depth: 5-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
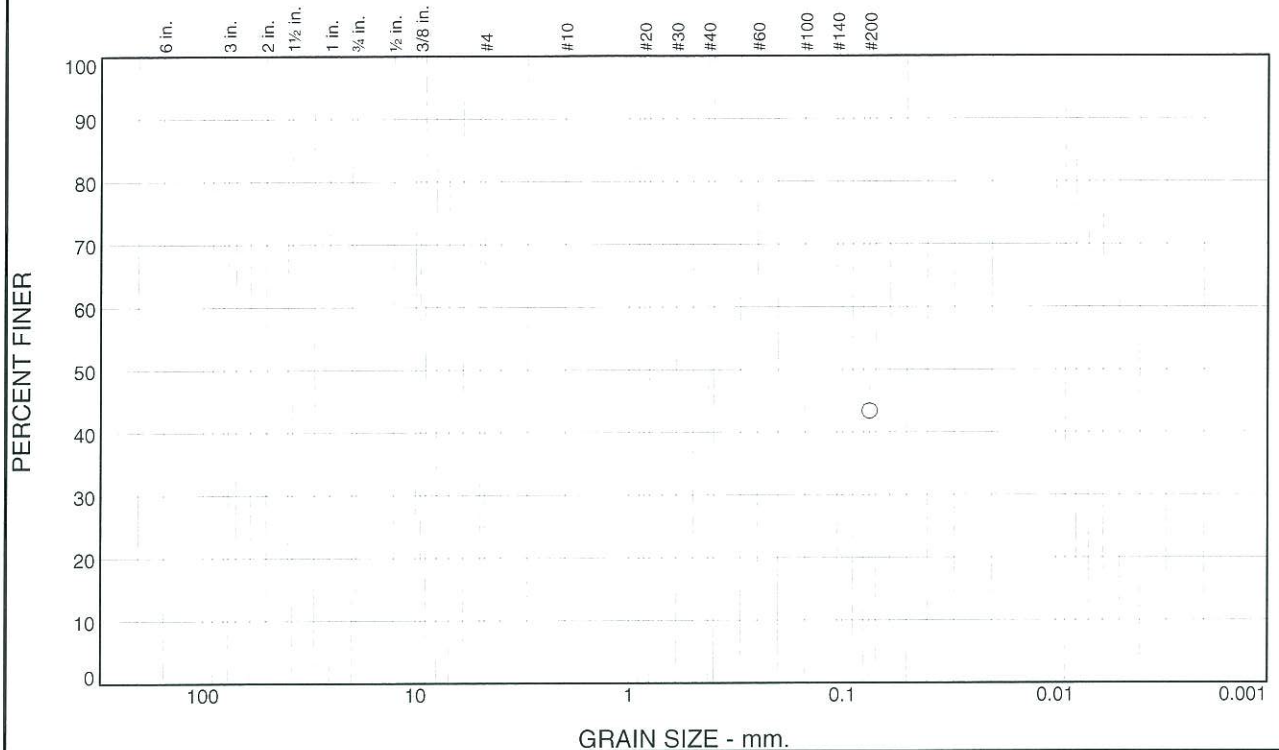
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						43.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	43.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S03
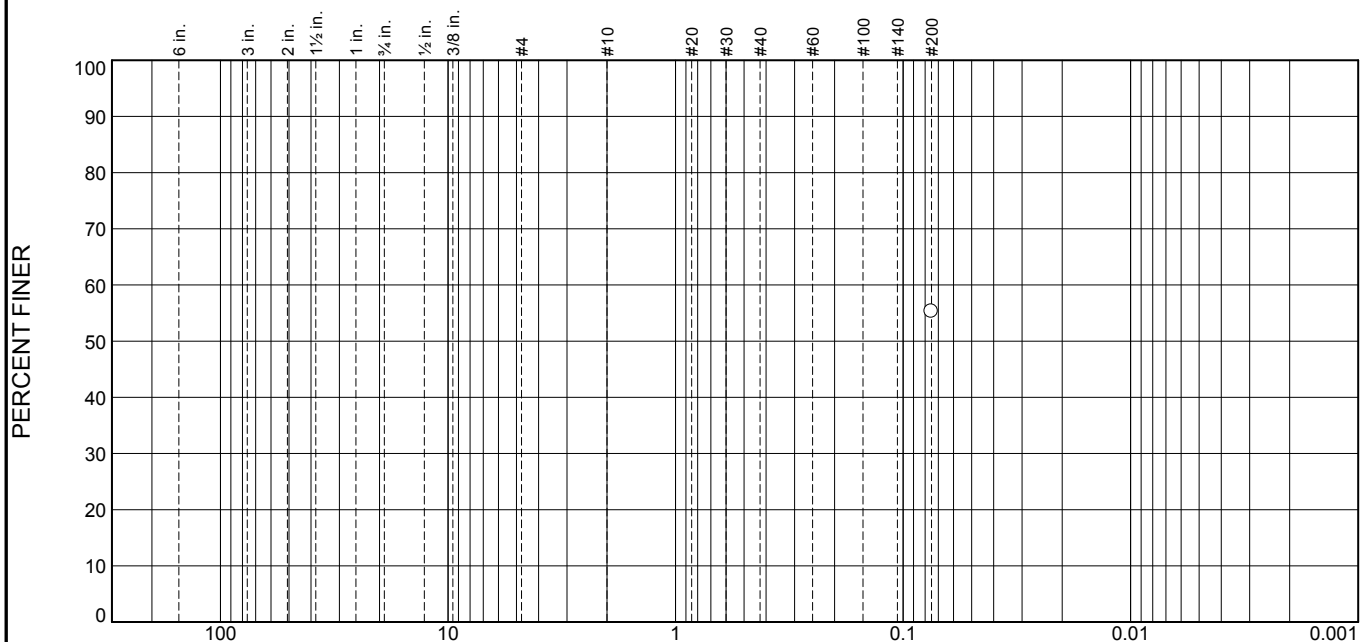Sample Number: S35699   Depth: 10-11.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
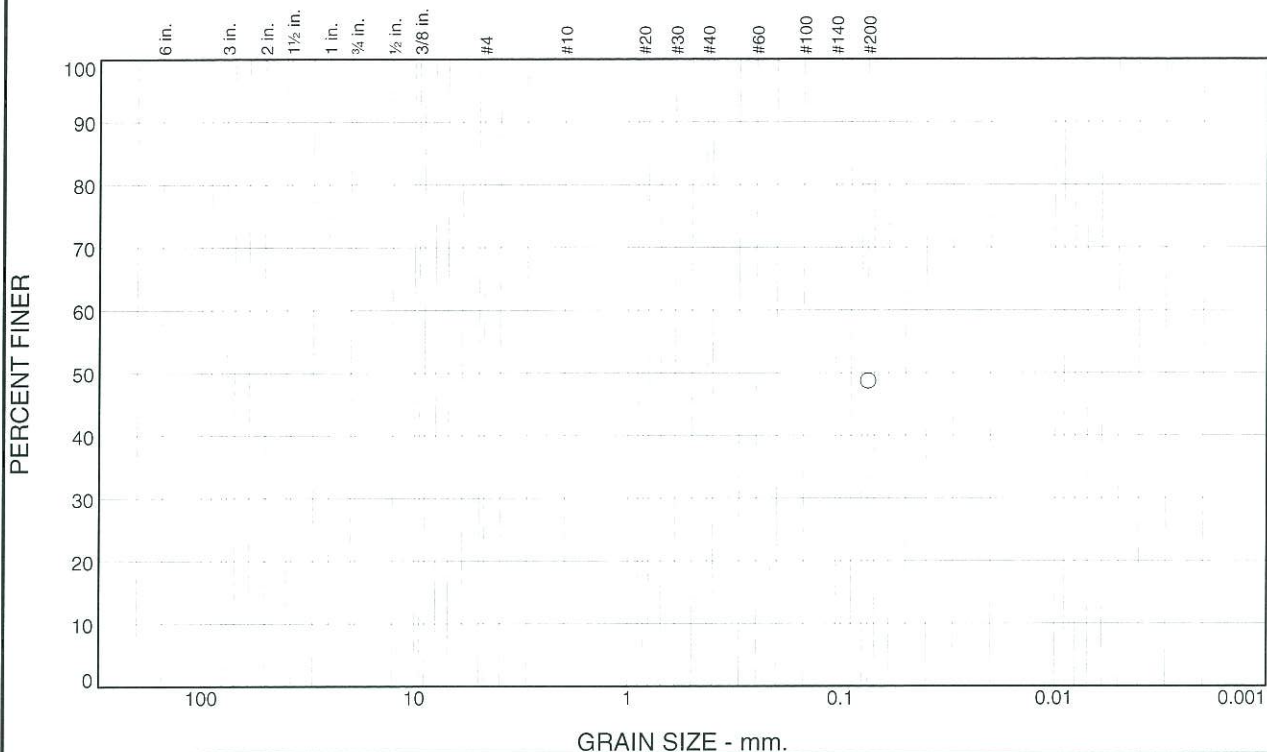
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						48.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	48.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S04
Sample Number: S36316   Depth: 15-16.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						38.0	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	38.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R. S05
Sample Number: S35700   Depth: 20-21.0

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	76.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cwU

Title: PM

Location: S0018R. S06
Sample Number: S36317   Depth: 25-26.2

Date Sampled:

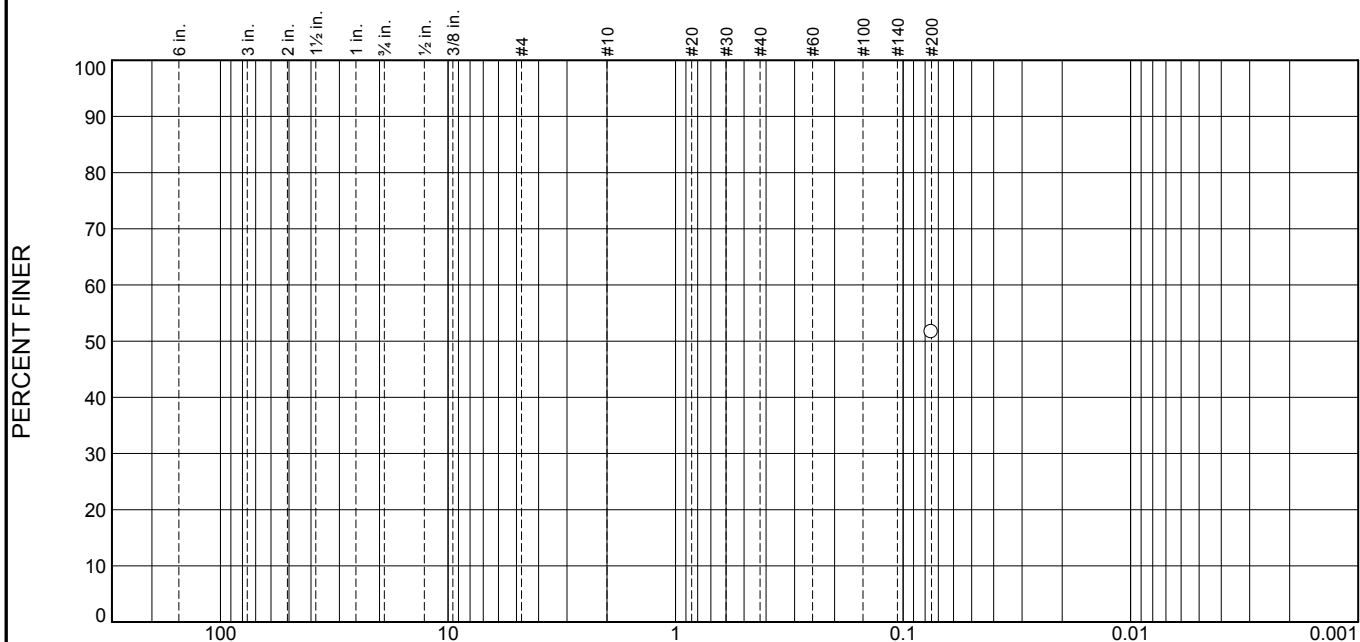## SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
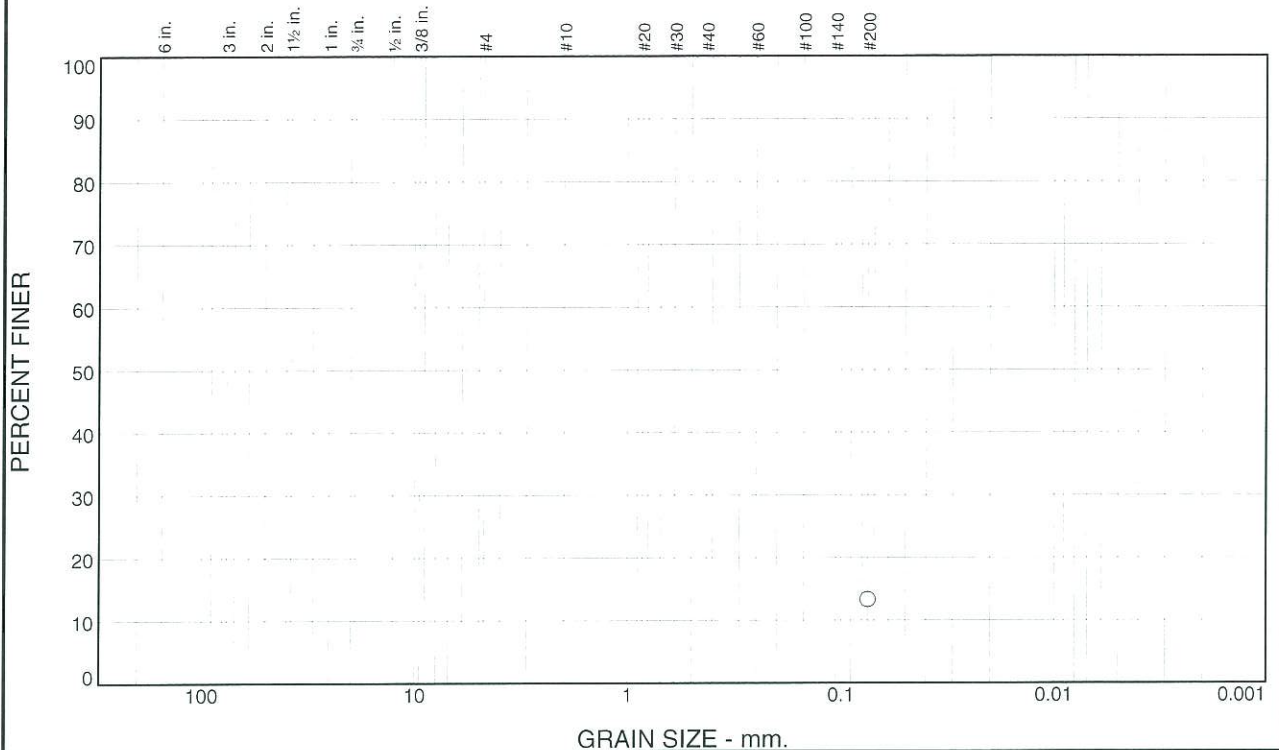
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						13.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	13.4		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R. S08
Sample Number: S35702   Depth: 35-36.3

Date Sampled:

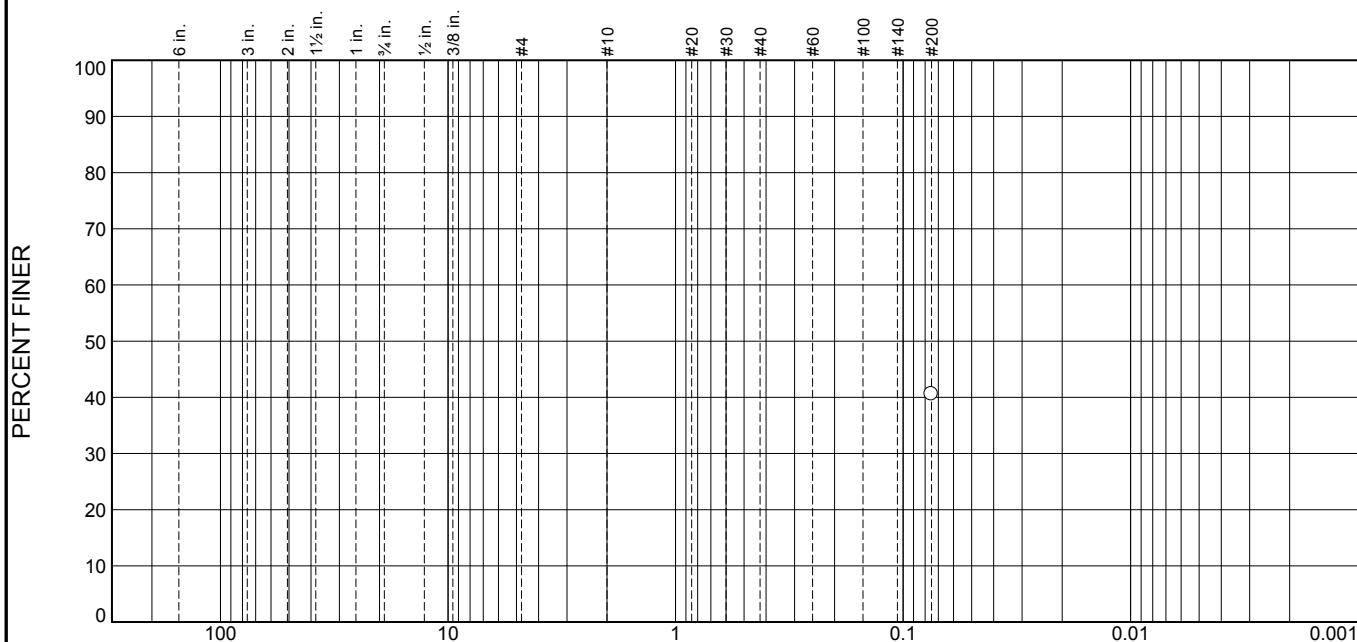**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

PERCENT FINER (y-axis, 0 to 100)

GRAIN SIZE - mm. (x-axis: 100, 10, 1, 0.1, 0.01, 0.001)

Sieve labels (top): 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	7.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S09
Sample Number: S36318   Depth: 40-41.1

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

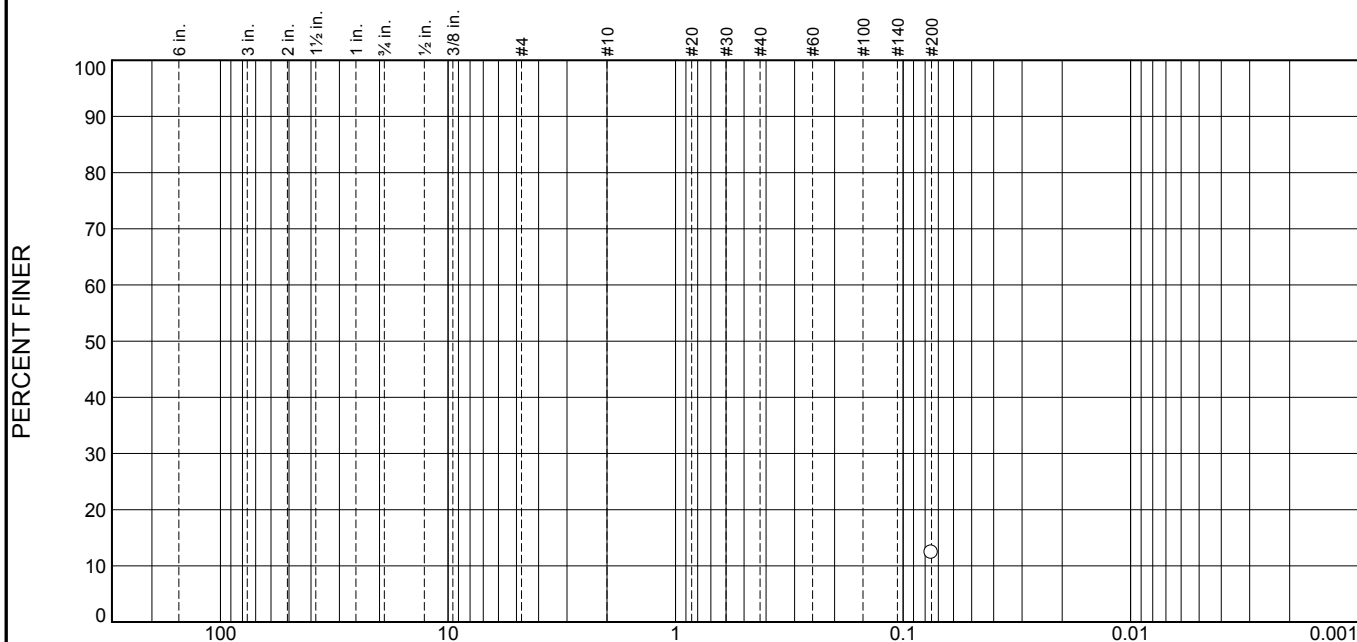Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
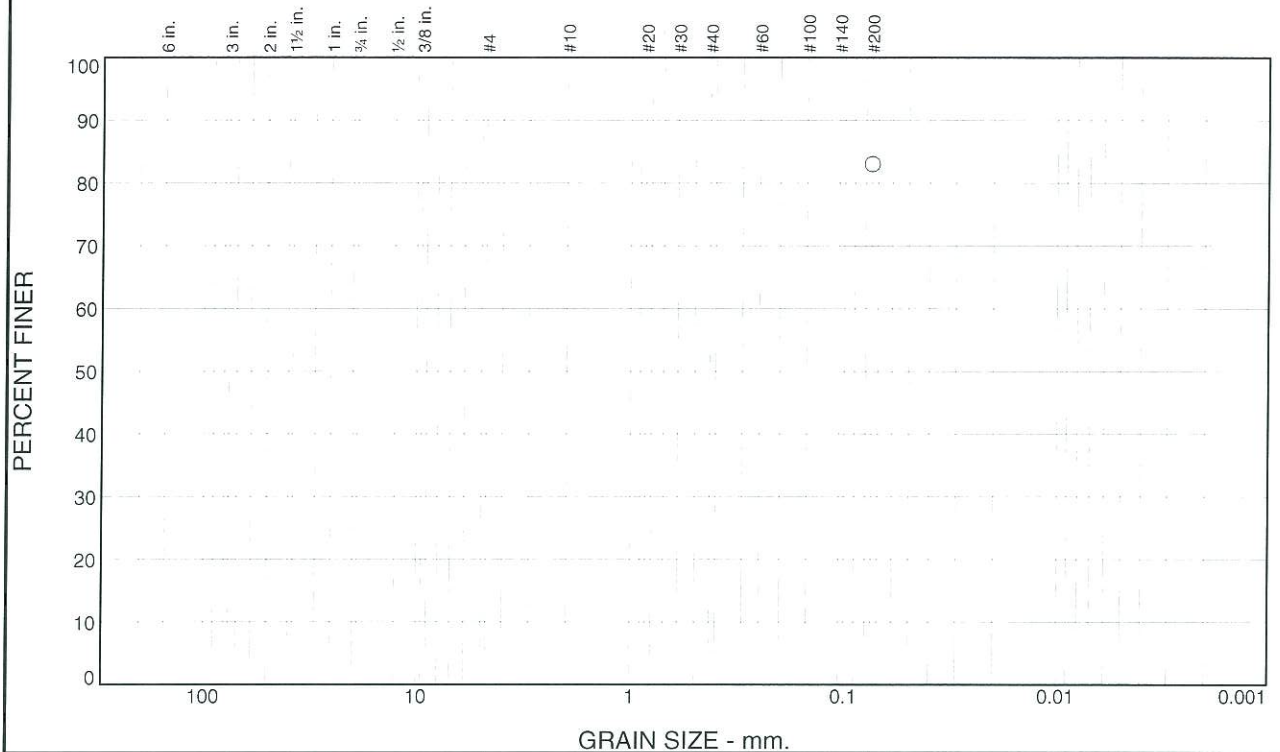
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						83.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	83.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R. S11A
Sample Number: S35704   **Depth:** 50-50.5

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	11.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R. S12
Sample Number: S35705   Depth: 55-55.7

Date Sampled:

## SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
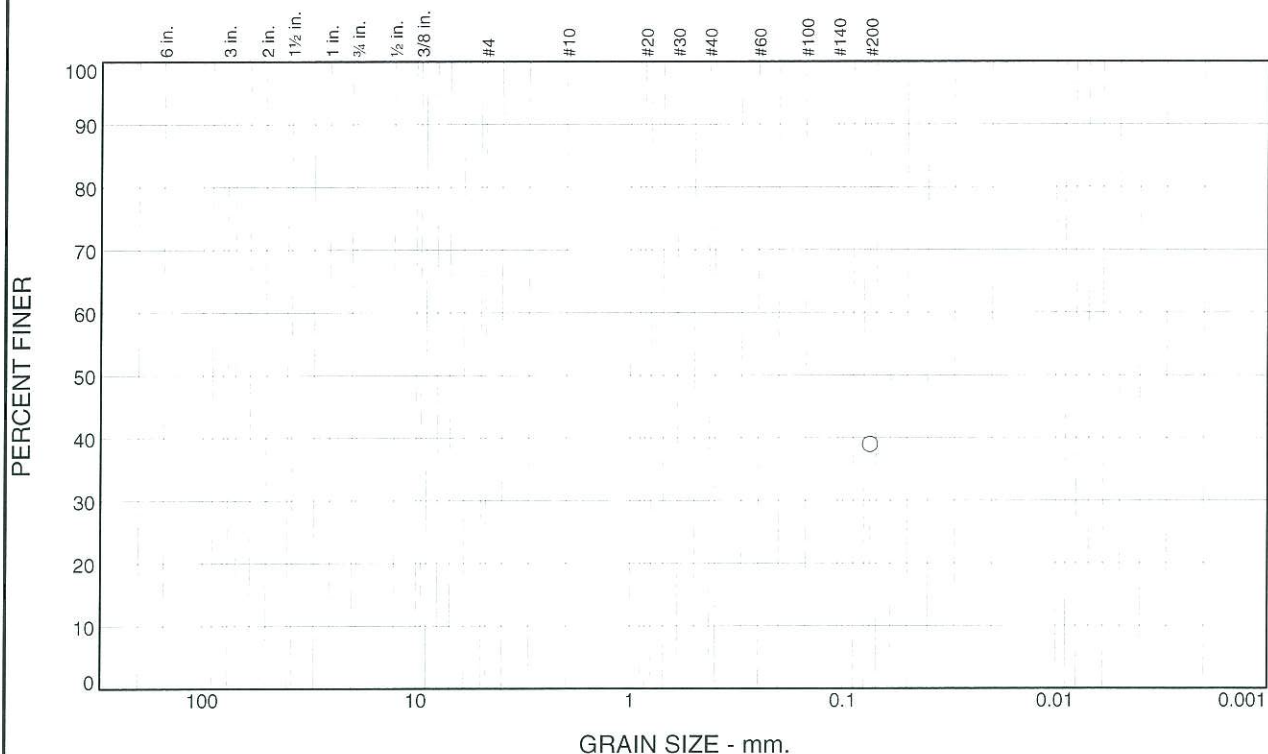
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						39.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	39.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S13
Sample Number: S35706   Depth: 60-60.8

Date Sampled:

SIERRA
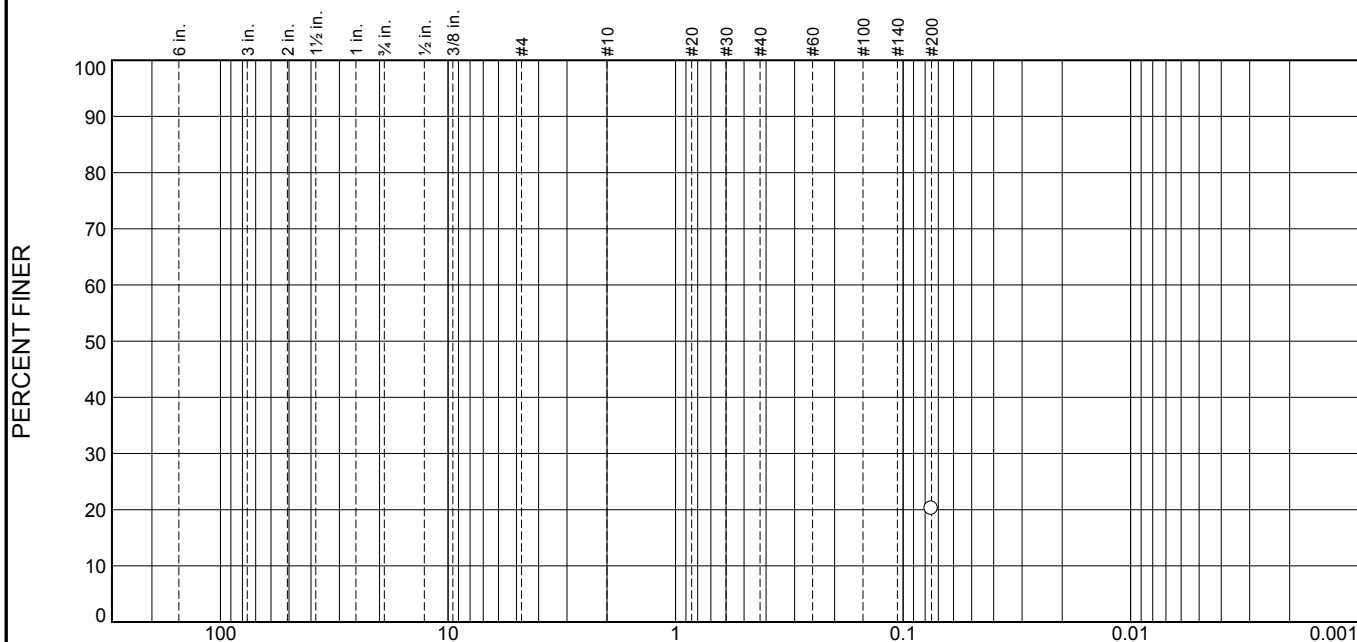## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	11.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S14
Sample Number: S36319   Depth: 65-65.7
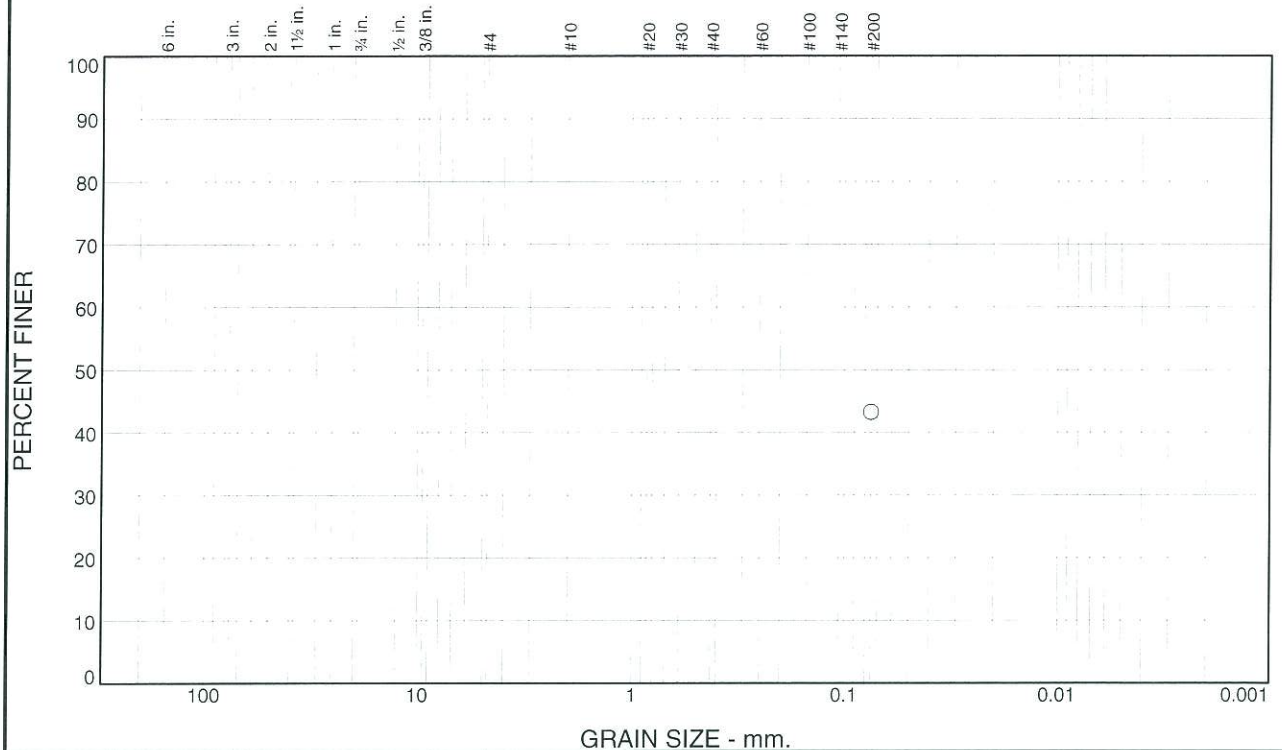
Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
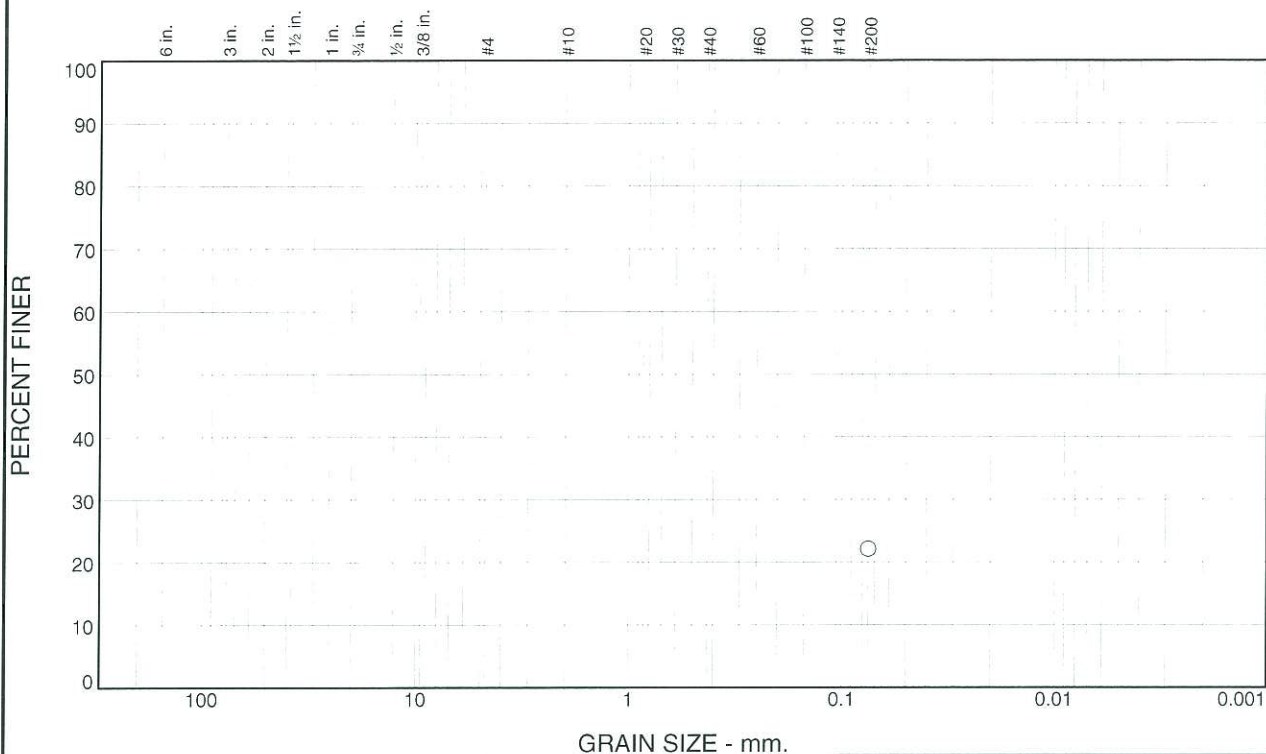
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						22.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	22.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S15
Sample Number: S35707   Depth: 70-71.2
Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
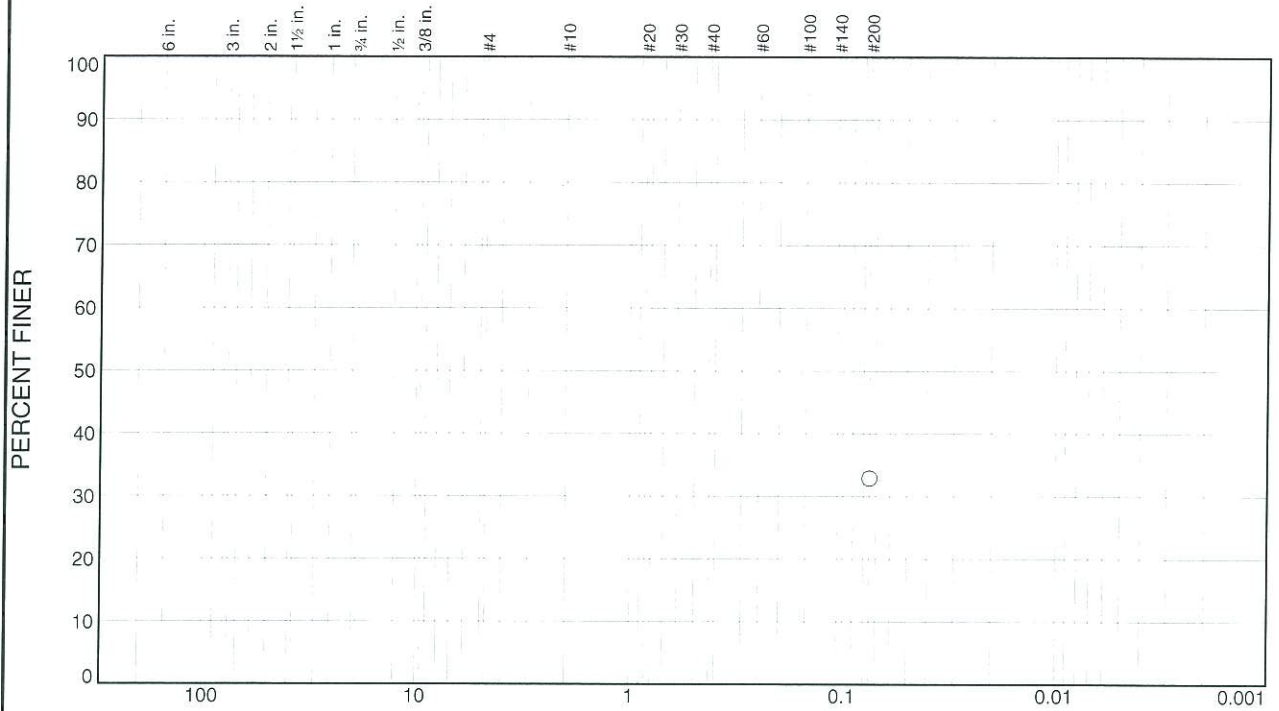
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						32.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	32.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S16
Sample Number: S36320   Depth: 75-75.6

Date Sampled:

SIERRA
TESTING LABS, INC.
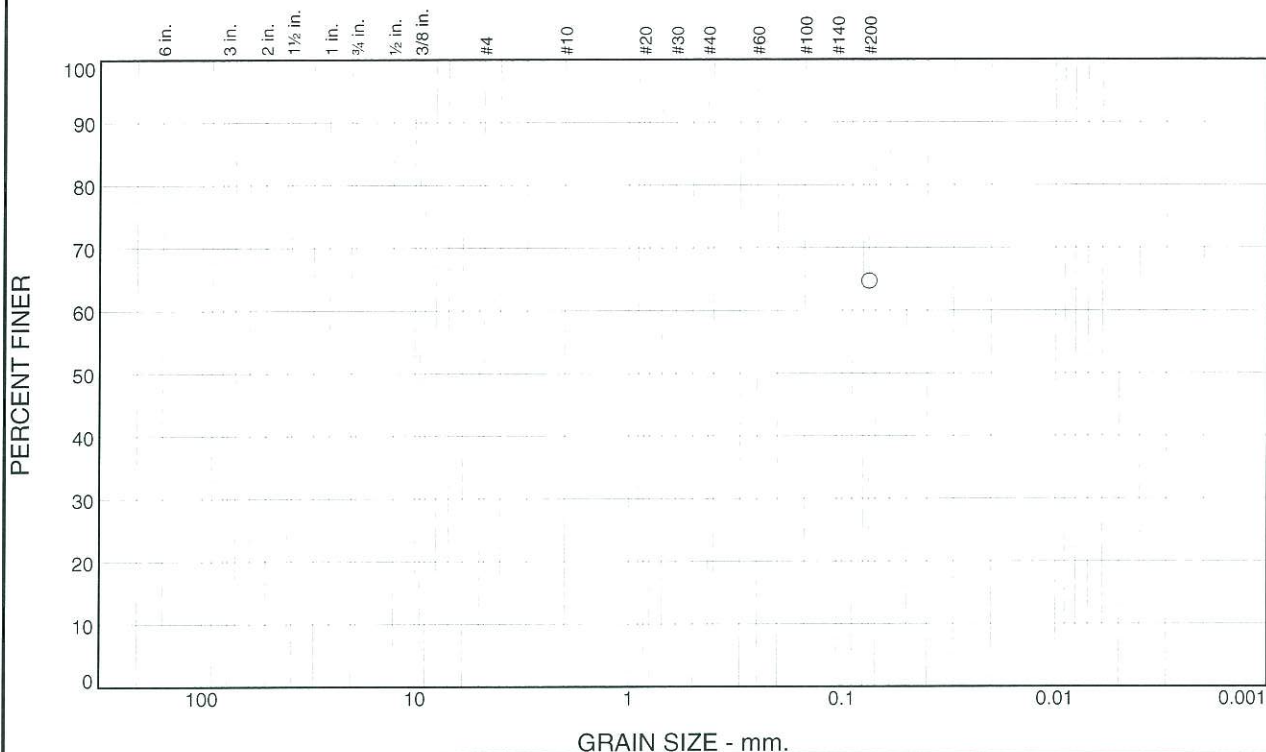## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.3		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S18

Sample Number: S36321   Depth: 85-86.4

Date Sampled:

**SIERRA TESTING LABS, INC. El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						84.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	84.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=　　　　　　LL=　　　　　　PI=

Classification
USCS (D 2487)=　　　　　　AASHTO (M 145)=

Coefficients
$D_{90}=$　　　　$D_{85}=$　　　　$D_{60}=$
$D_{50}=$　　　　$D_{30}=$　　　　$D_{15}=$
$D_{10}=$　　　　$C_u=$　　　　$C_c=$

Remarks

Date Received: 11/1/11　　　Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S19A
Sample Number: S35709　　　Depth: 90-90.4

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111　　　　　　Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
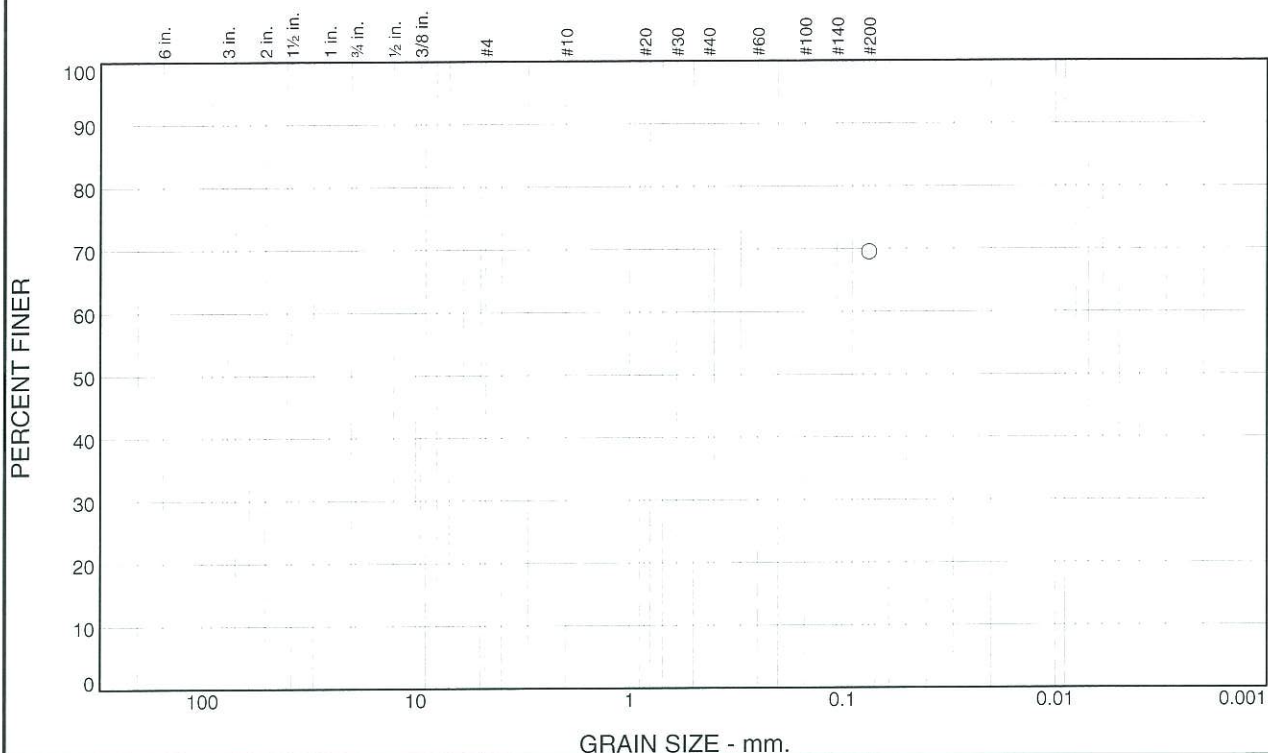
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						69.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	69.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S19B
Sample Number: S35710   Depth: 90.4-91.2

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
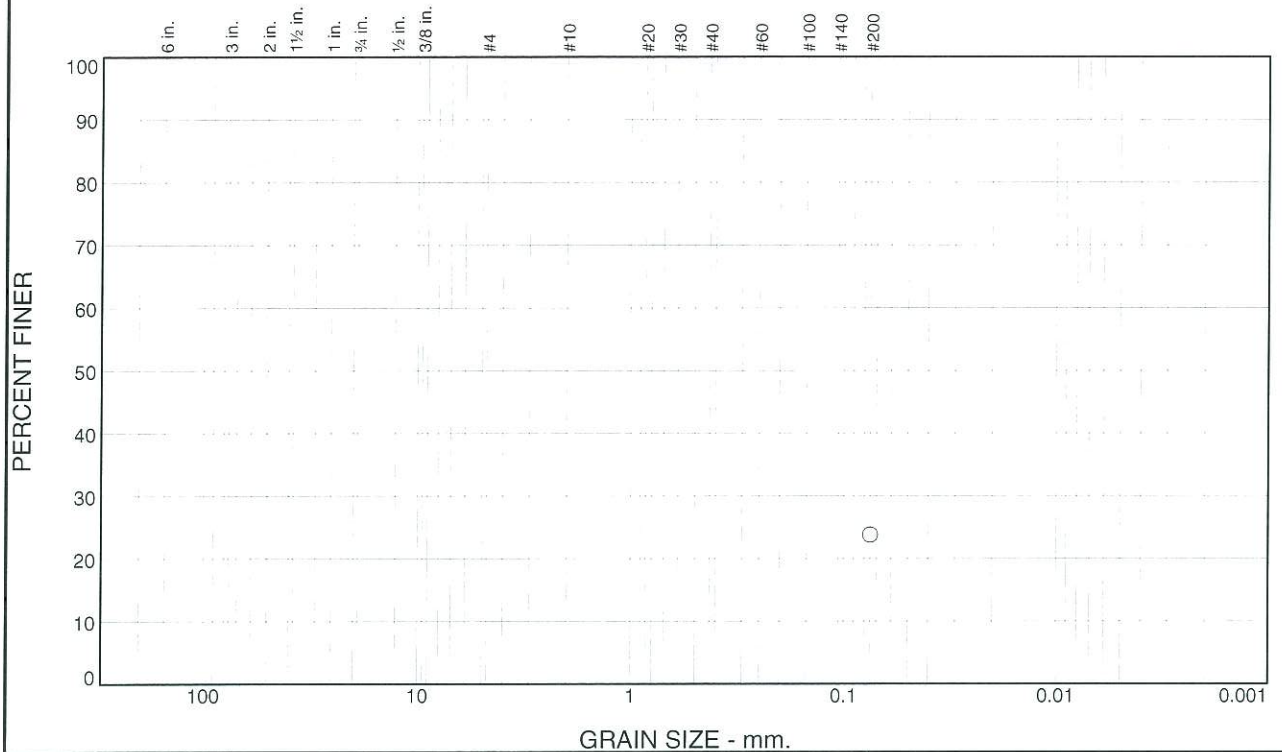
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						23.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	23.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R, S20
Sample Number: S36322   Depth: 95-96.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
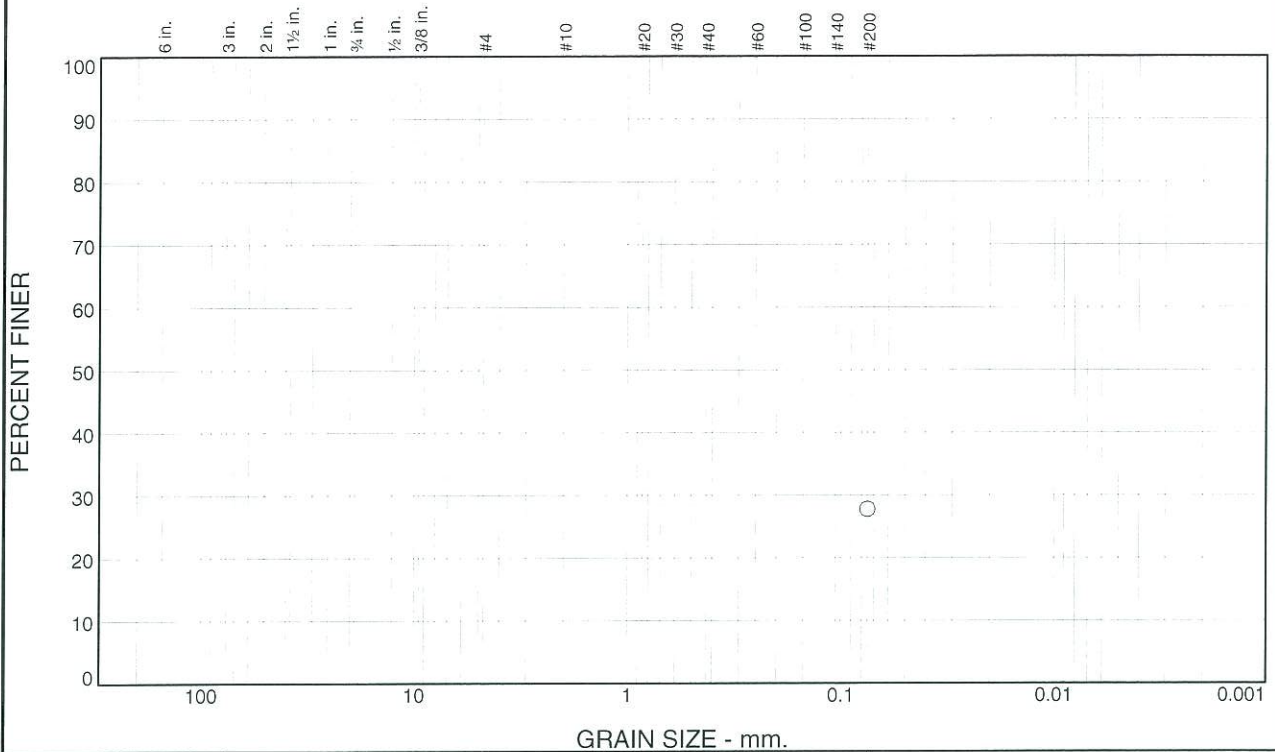
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						27.8	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	27.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R, S21   Date Sampled:
Sample Number: S35711   Depth: 100.0-100.5

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	37.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R, S22
Sample Number: S35712   Depth: 105-106.0

Date Sampled:

SIERRA TESTING LABS, INC.
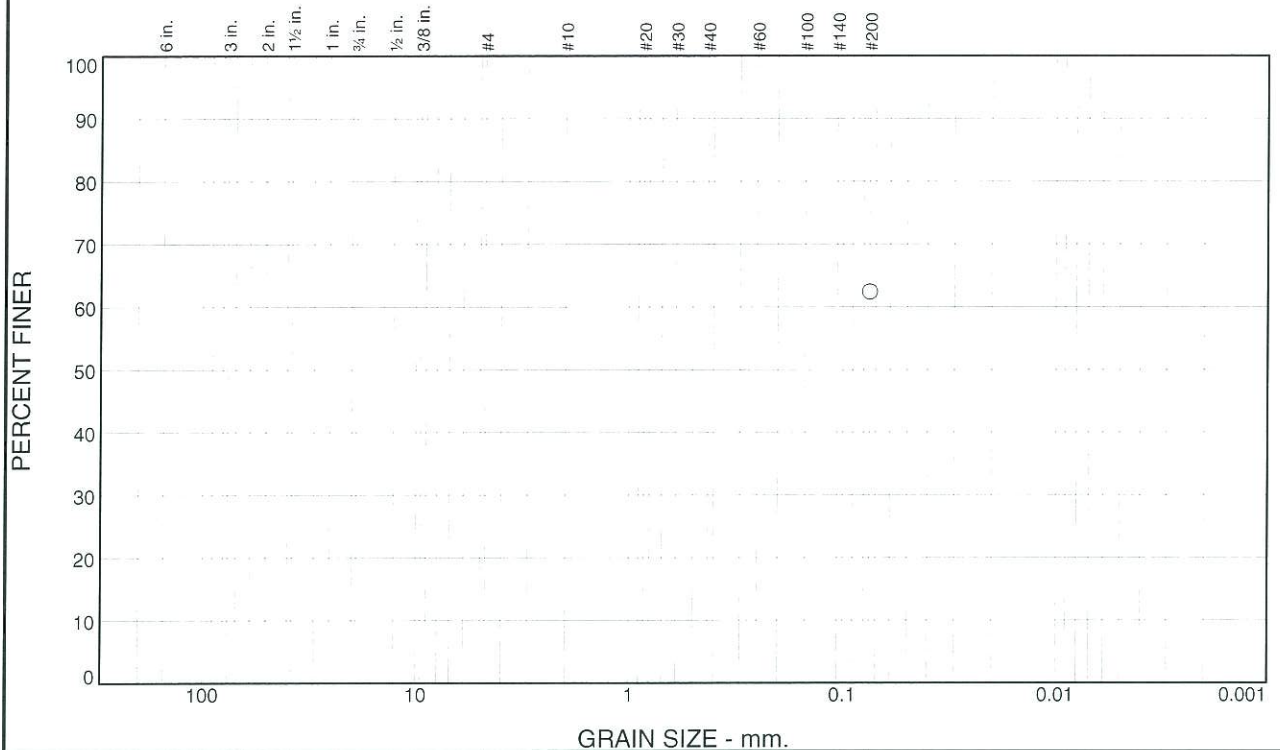**El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
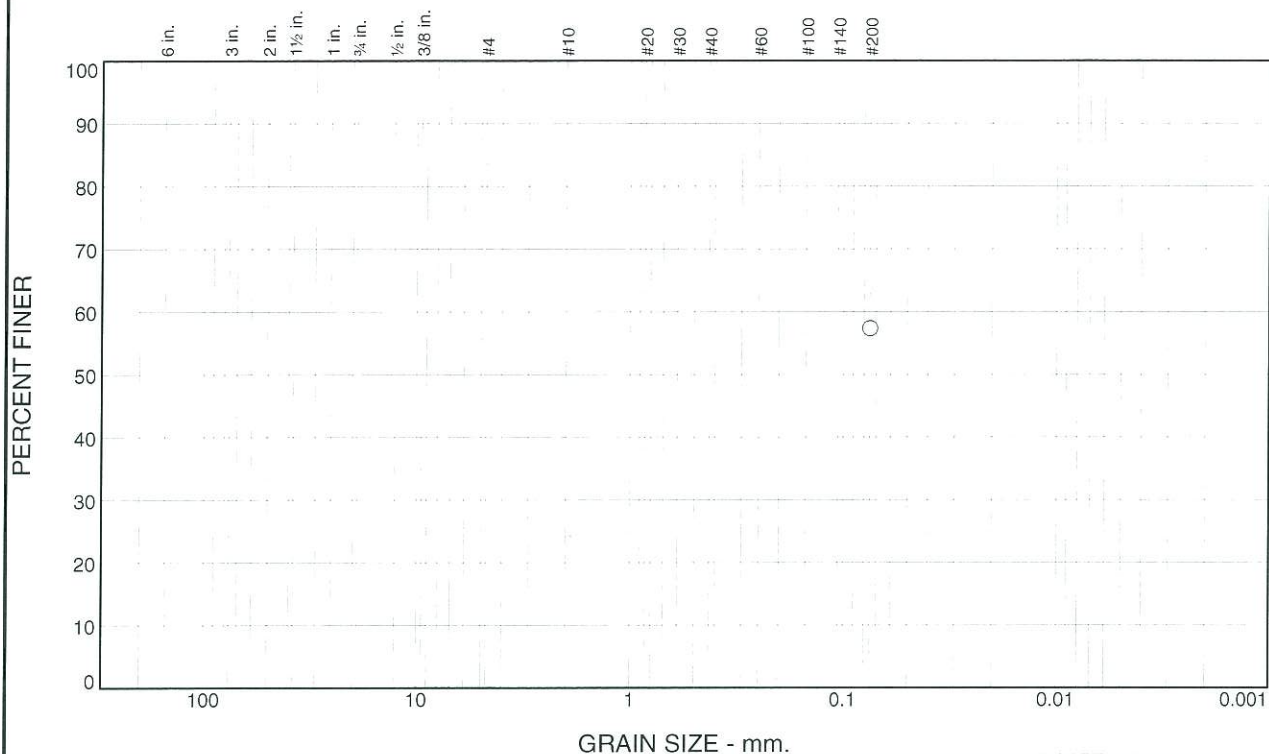
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						57.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	57.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R, S25
Sample Number: S35714   Depth: 120-120.8

Date Sampled:

SIERRA TESTING LABS, INC.
**El Dorado Hills, CA**

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						23.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	23.8		

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

* (no specification provided)

Location: S0018R, S27
Sample Number: S36323   Depth: 130-130.9

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM / ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
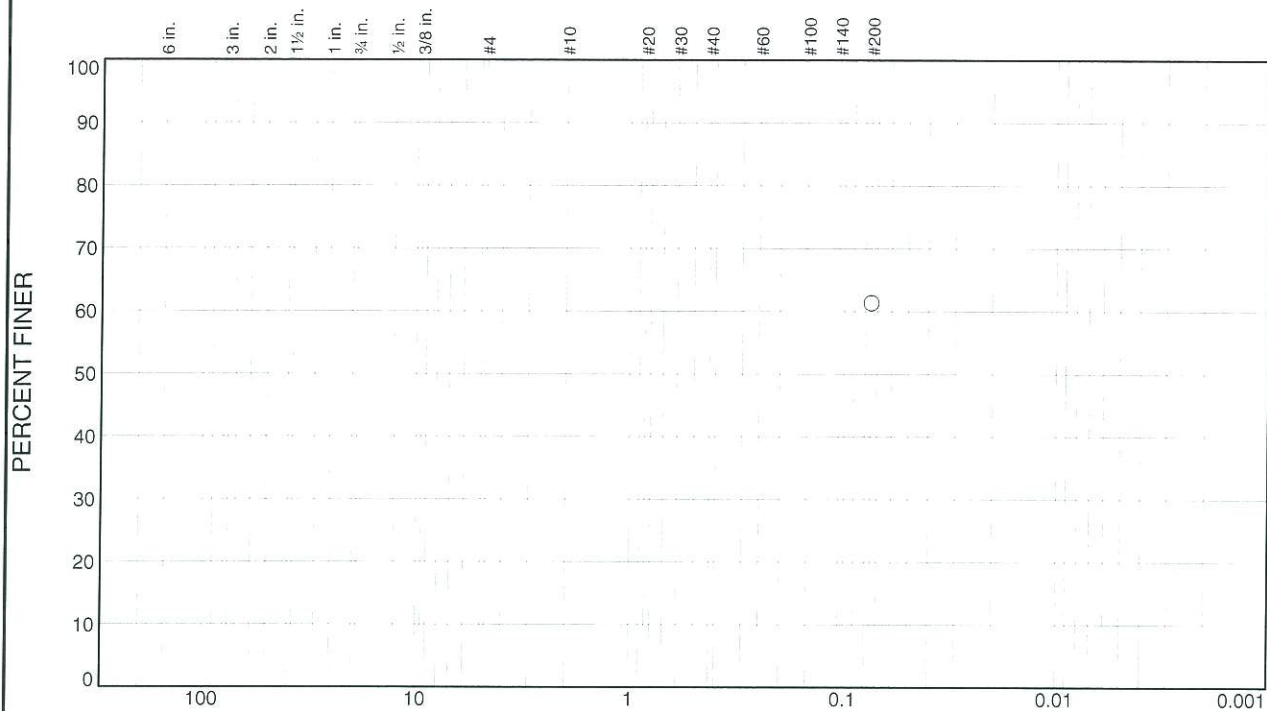
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	61.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R, S28
Sample Number: S35716   Depth: 135-136.0

Date Sampled:

SIERRA
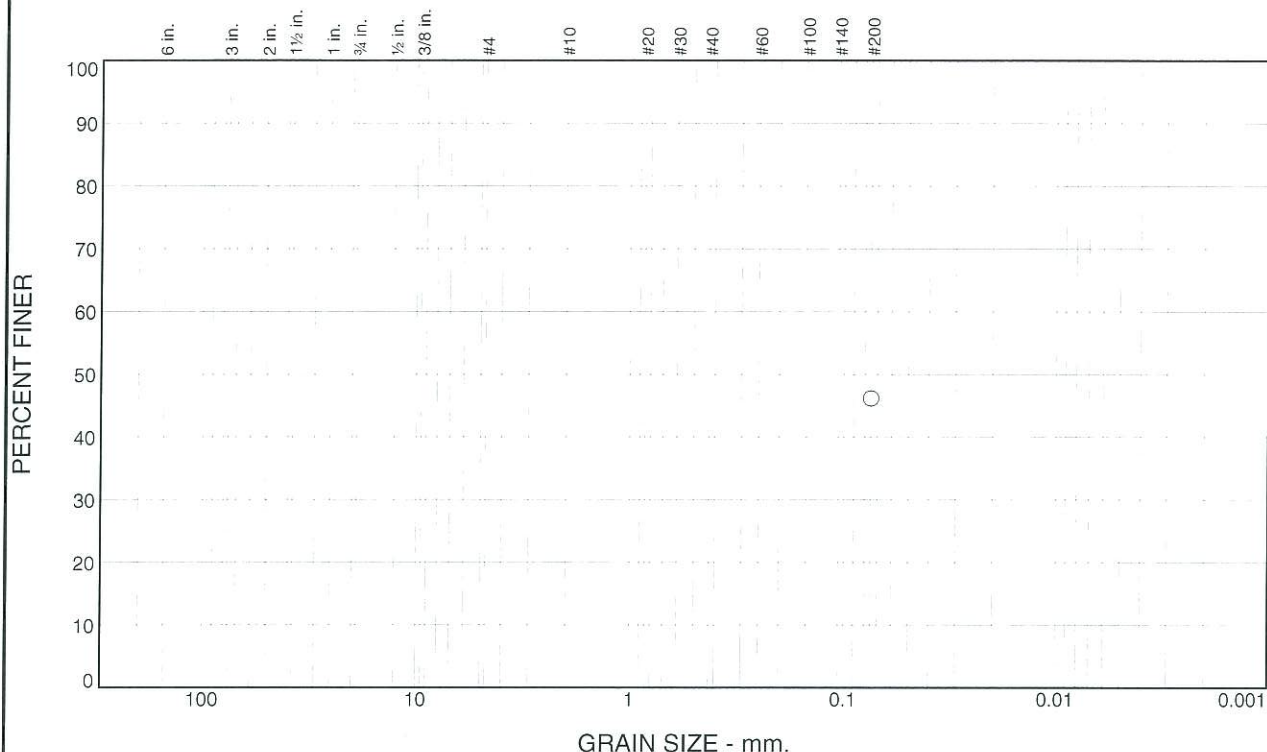## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						42.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	42.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0018R. S29A
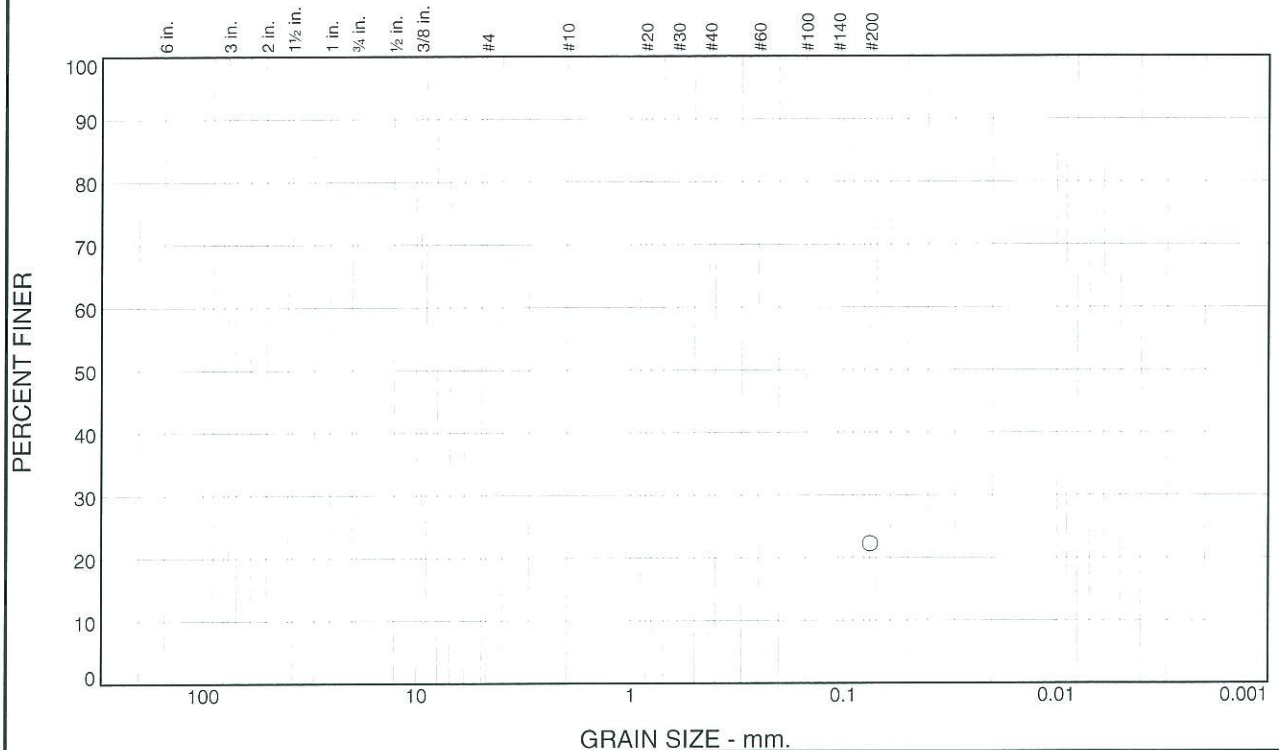Sample Number: S35717   Depth: 140-141.1

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						85.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	85.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0018R, S29B
Sample Number: S35718   Depth: 141.1-141.4

Date Sampled:

SIERRA
TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						49.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	49.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0018R. S30
Sample Number: S36324   **Depth:** 145-146.0

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						17.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	17.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

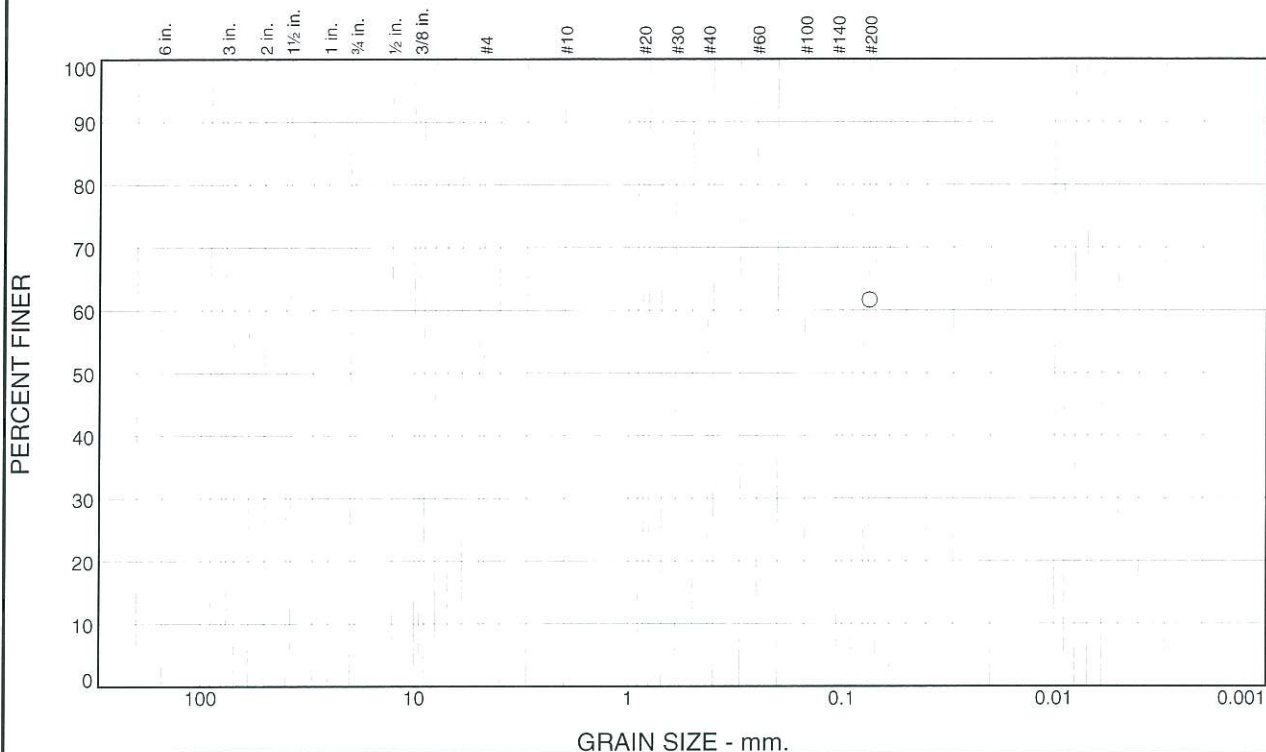Checked By: cw

Title: PM

Location: S0018R, S31
Sample Number: S35719   Depth: 150-151.0

Date Sampled:

SIERRA TESTING LABS, INC. El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
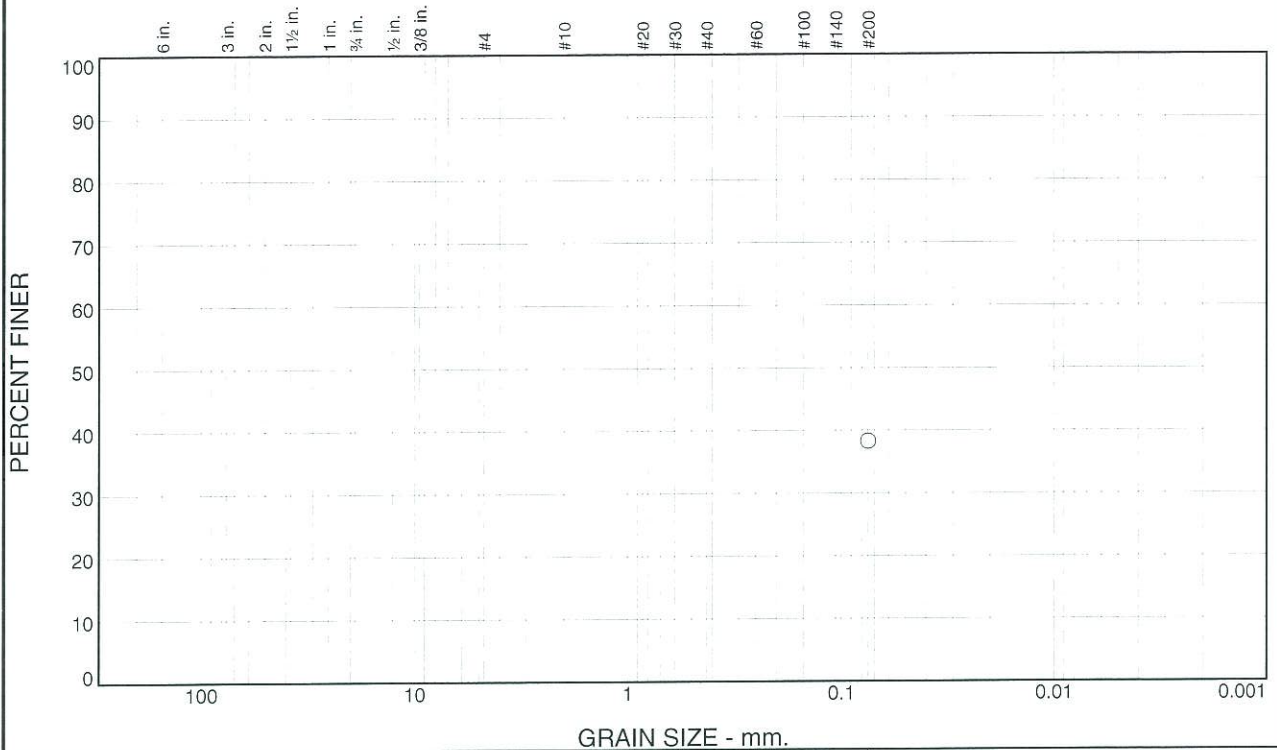
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						38.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	38.3		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R. S01
Sample Number: S36325   Depth: 0-5.0

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						39.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	39.5		

*(no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
D90=   D85=   D60=
D50=   D30=   D15=
D10=   Cu=   Cc=

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R, S02A
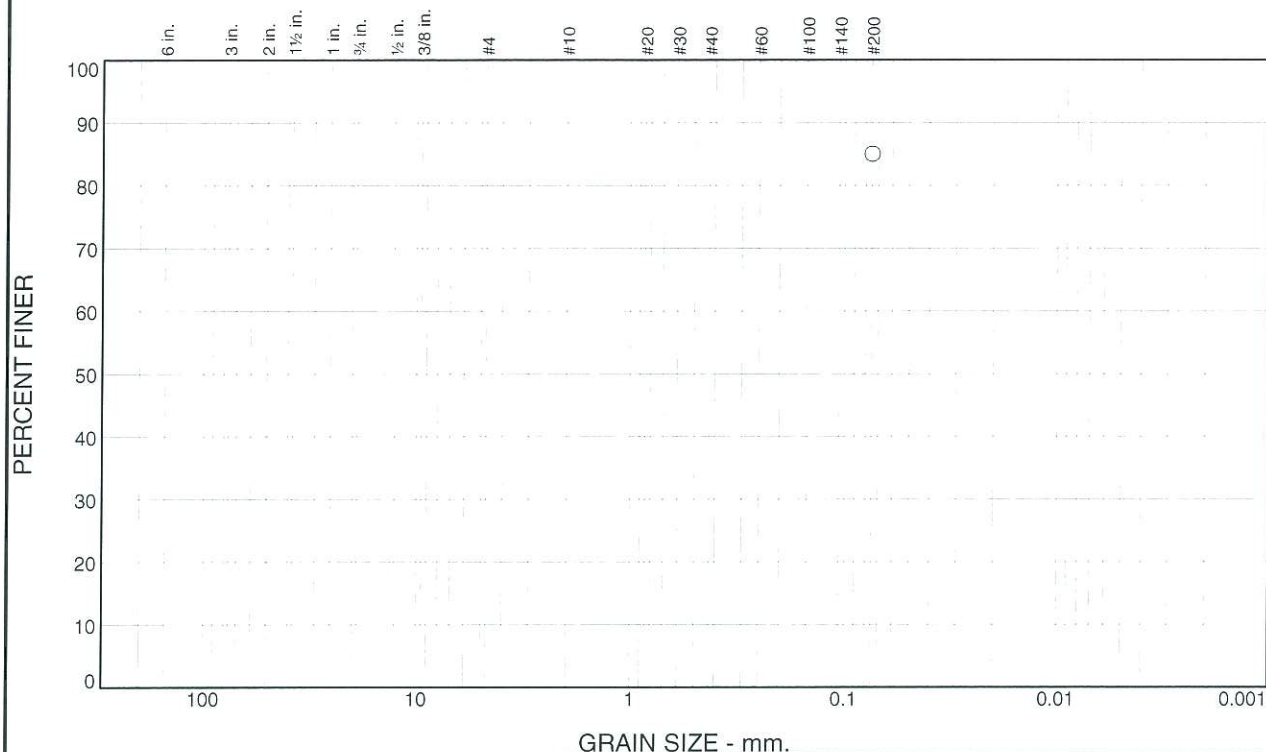**Sample Number:** S36326   **Depth:** 5-5.8

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	64.4		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0019R, S02B
Sample Number: S35720   **Depth:** 5.8-6.5

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						43.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	43.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R, S03A
Sample Number: S36327   Depth: 6.5-7.6

Date Sampled:

SIERRA TESTING LABS, INC.
## El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.
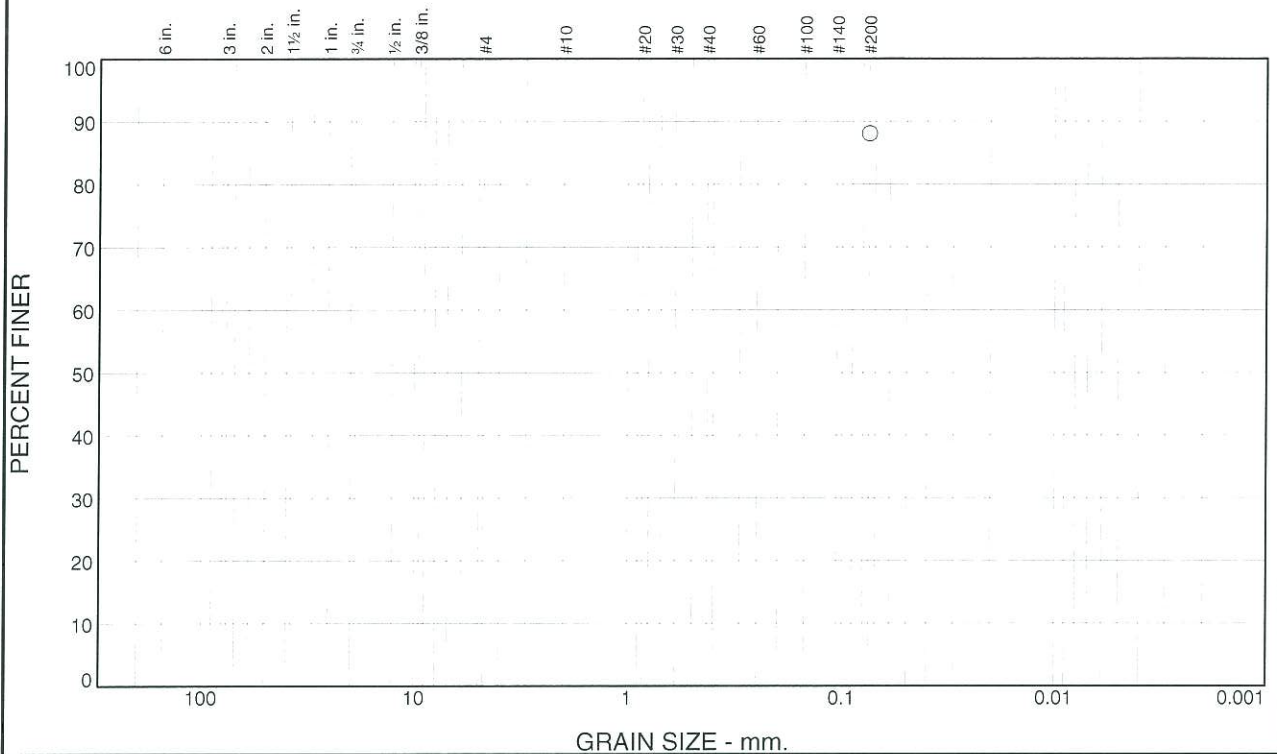
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	88.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R, S04B
Sample Number: S36328   Depth: 9-10.0

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0019R, S05
Sample Number: S35721   Depth: 9.5-10.8

Date Sampled:

**SIERRA TESTING LABS, INC.**
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report
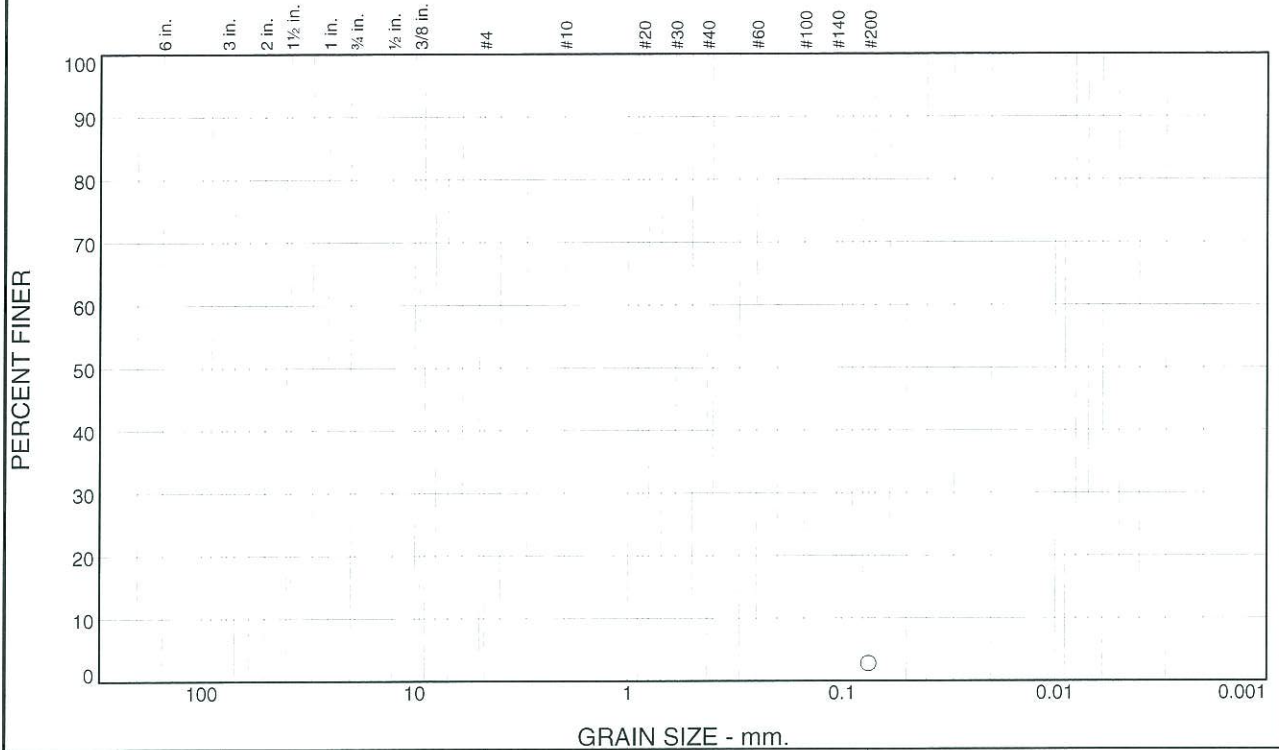
	% Gravel		% Sand			% Fines	
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						2.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	2.8		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   Date Tested: 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R, S08
Sample Number: S36329   Depth: 14-15.2

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						5.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	5.0		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R. S10
Sample Number: S36330   **Depth:** 25.5-26.7

Date Sampled:

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
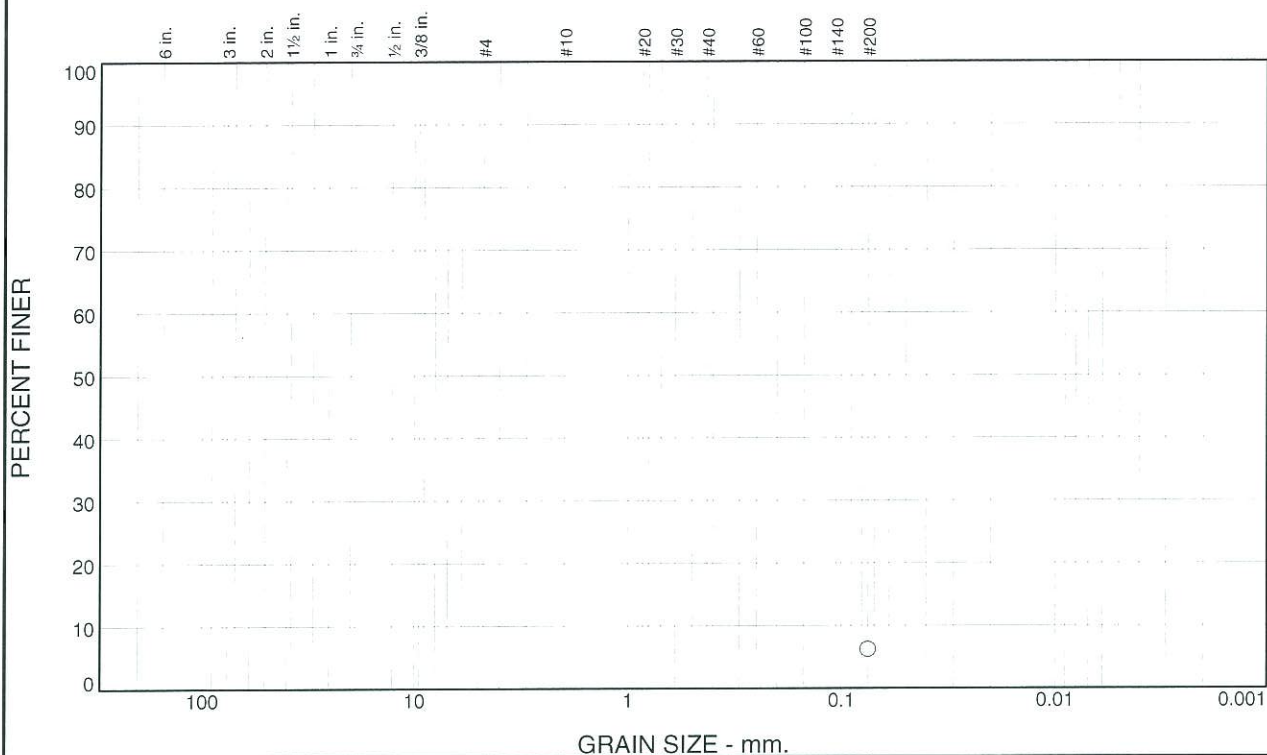
% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6.3	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	6.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks
Sample labeled S11 @30-31.3

Date Received: 11/16/11   Date Tested: 11/16/11
Tested By: ac
Checked By: cw
Title: PM

Location: S0019R, S12
Sample Number: S30-31.3   Depth: 30-31.3

Date Sampled:

SIERRA
## TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	76.9		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
Checked By: cw
Title: PM

Location: S0019R, S12A
**Sample Number:** S35724   **Depth:** 35-35.7

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

Particle Size Distribution Report
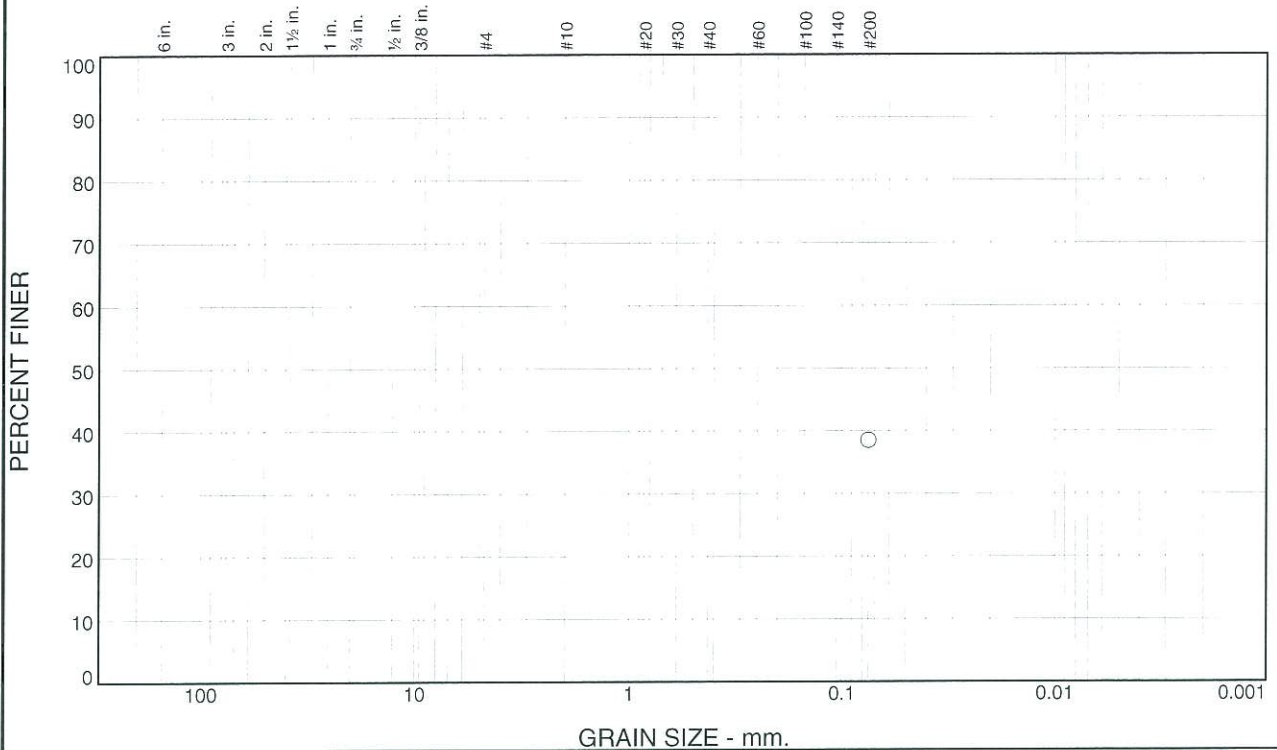
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						38.6	

GRAIN SIZE - mm.

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	38.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)
PL=   LL=   PI=

Classification
USCS (D 2487)=   AASHTO (M 145)=

Coefficients
$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11
Tested By: ky
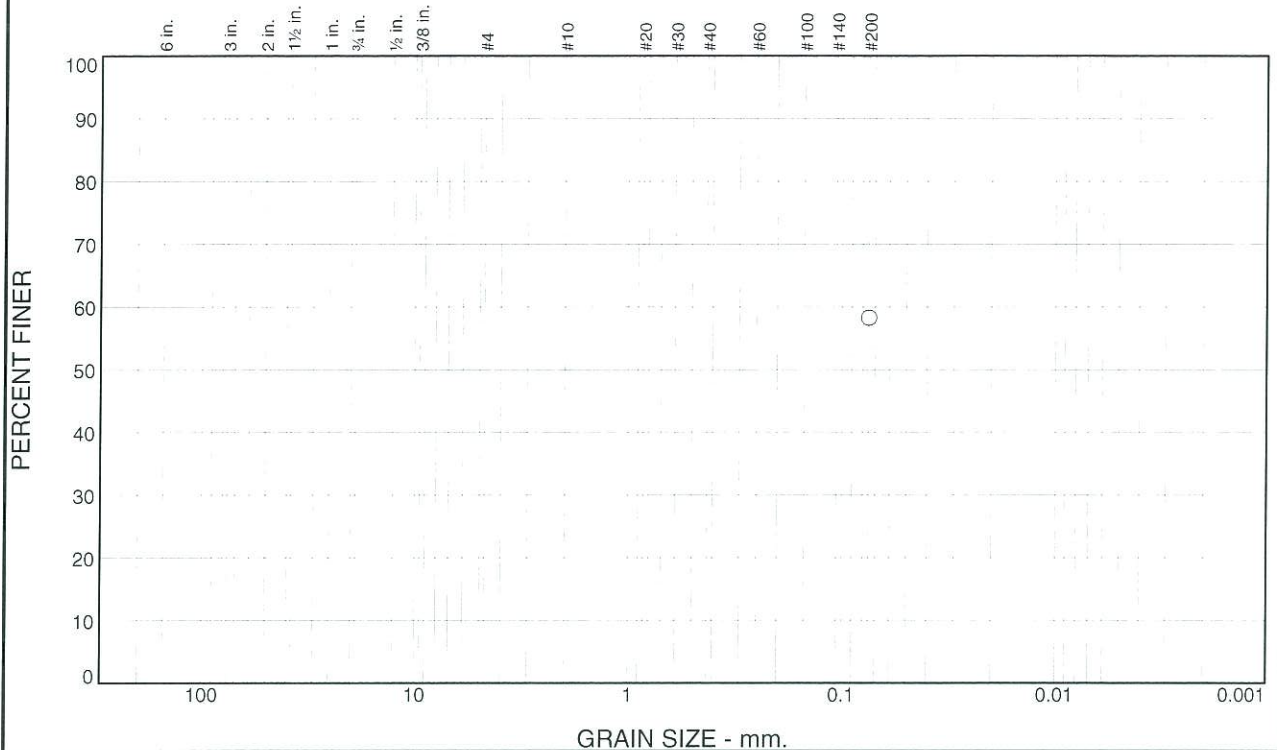Checked By: cw
Title: PM

Location: S0019R, S12B
Sample Number: S35725   Depth: 35.7-36.4
Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   Figure

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	58.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/1/11   Date Tested: 11/1/11

Tested By: ky

Checked By: cw

Title: PM

Location: S0019R, S13
Sample Number: S35726   Depth: 40-40.8

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Project No: 11-111   Figure

Particle Size Distribution Report
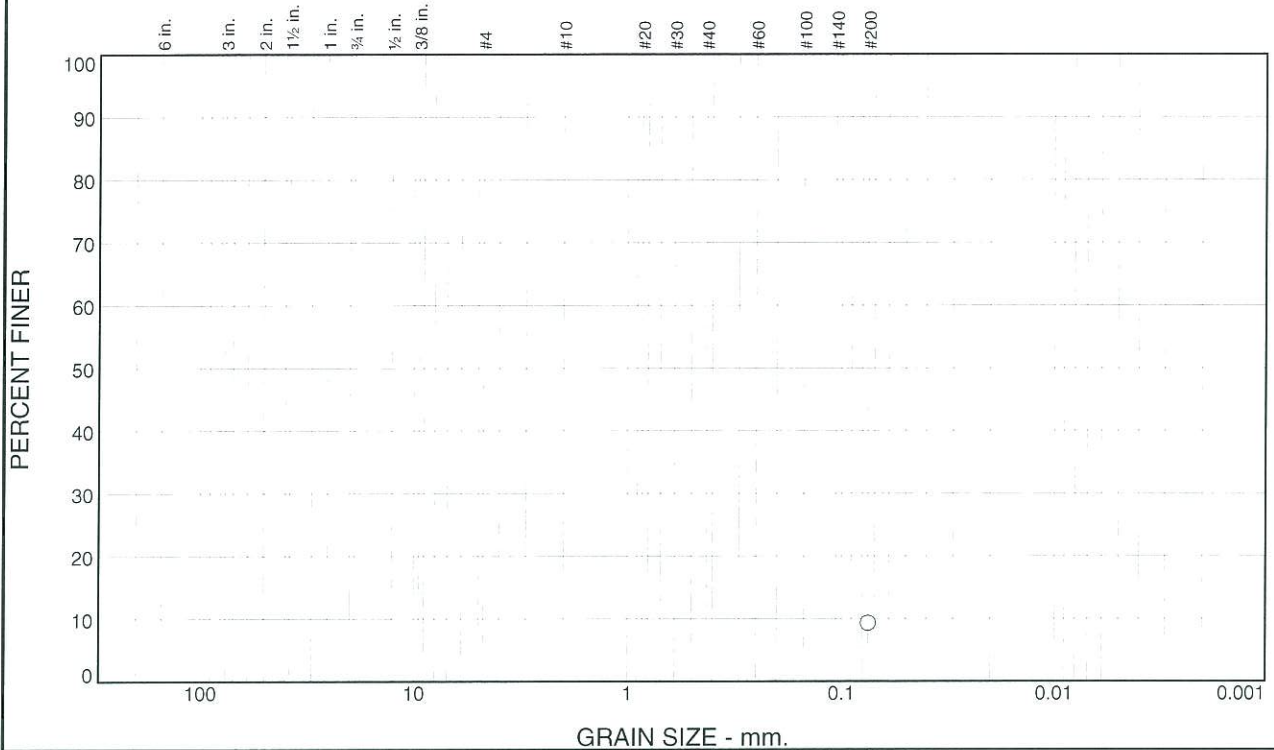
| % +3" | % Gravel | | % Sand | | | % Fines | |
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						9.3	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	9.3		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL=   LL=   PI=

Classification

USCS (D 2487)=   AASHTO (M 145)=

Coefficients

$D_{90}=$ $D_{85}=$ $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

Date Received: 11/16/11   **Date Tested:** 11/16/11

Tested By: ac

Checked By: cw

Title: PM

Location: S0019R. S14
**Sample Number:** S36332   **Depth:** 45-46.3

Date Sampled:

SIERRA
TESTING LABS, INC.
El Dorado Hills, CA

Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Project No: 11-111   **Figure**

<table>

										Peak Strength	

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Friction Angle, ϕ' (degrees)	Cohesion Intercept, c' (psf)
S0001R	S04	8.8	278.6	SP-SM	5.3	107.9	245	196	6.7	34	30
					5.2	107.9	504	373	12.1		
					5.2	107.9	994	703	11.2		
S0002R	S02	5.7	284.7	SM	2.8	115.0	158	120	3.0	38	7
					2.8	115.0	317	269	10.4		
					2.7	115.1	634	495	8.8		
S0003R	S04	8.5	279.5	ML	19.0	125.0	216	575	2.1	41	376
					19.0	125.0	446	749	2.3		
					19.2	124.9	878	1,148	2.2		
S0003R	S10	25.7	262.3	SP-SM	18.0	121.9	778	1,030	2.5	41	364
					17.8	121.9	1,555	1,738	2.9		
					18.3	121.8	3,125	3,080	5.3		
S0003R	S15	50.4	237.6	SP-SM	10.3	130.9	1,656	1,934	3.3	42	448
					10.3	130.9	3,298	3,384	5.1		
					10.3	130.9	6,595	6,343	3.7		
S0004R	S04	8.7	275.0	SM	9.3	118.9	259	334	1.6	43	156
					9.5	118.9	518	729	2.5		
					9.2	118.9	1,037	1,086	2.5		
S0004R	S11	30.7	253.0	SM	16.1	136.2	994	1,312	3.2	42	462
					16.1	136.2	1,987	2,308	5.2		
					16.2	136.2	3,960	3,995	4.8		

</table>

TABLE E-3

SUMMARY OF REMOLDED DIRECT SHEAR TEST RESULTS

| TABLE E-3 |
| SUMMARY OF REMOLDED DIRECT SHEAR TEST RESULTS |

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength	
										Friction Angle, ϕ' (degrees)	Cohesion Intercept, c' (psf)
S0004R	S13	40.5	243.2	ML	14.9	137.0	1,339	2,114	3.3	41	1,043
					14.9	137.0	2,678	3,540	3.7		
					15.0	136.9	5,357	5,682	4.5		
S0005R	S02	5.8	279.5	SP-SM	5.3	111.9	158	206	4.5	37	79
					5.0	111.9	317	297	12.8		
					5.0	111.9	634	553	16.0		
S0005R	S08	14.3	271.0	ML	13.1	97.9	418	320	4.9	32	30
					13.5	98.0	835	501	11.1		
					13.3	97.9	1,685	1,089	10.7		
S0005R	S10	25.4	259.9	ML	18.5	119.0	749	870	3.3	41	223
					18.8	118.9	1,498	1,552	4.9		
					18.5	119.0	2,995	9,150	7.1		
S0005R	S15	47.0	238.3	ML	19.3	129.9	1,526	1,630	3.3	39	324
					19.5	130.0	3,038	2,696	5.8		
					19.3	129.9	6,077	5,293	7.4		
S0006R	S14	38.7	248.9	SM	11.9	137.0	1,210	2,200	4.0	37	1,525
					12.1	137.0	2,419	3,696	4.0		
					12.1	137.0	4,838	5,046	10.4		
S0007R	S04	5.7	279.4	SM	13.2	136.9	173	347	2.5	41	187
					13.3	136.9	346	465	2.9		
					13.0	137.0	677	773	2.5		

											Peak Strength	
TABLE E-3												
SUMMARY OF REMOLDED DIRECT SHEAR TEST RESULTS												
Borehole ID	**Sample No.**	**Depth**	**Elevation (NAVD88)**	**USCS Group**	**Moisture Content, w_o**	**Total Unit Weight, γ_t**	**Normal Stress, σ_n**	**Stress at Failure, τ_{fail}**	**Strain at Failure, ε_{fail}**		**Friction Angle, ϕ'**	**Cohesion Intercept, c'**
		(ft)	**(ft)**		**(%)**	**(pcf)**	**(psf)**	**(psf)**	**(%)**		**(degrees)**	**(psf)**
S0010R	S02	5.8	280.3	SM	3.9	120.9	173	223	2.9		36	88
					4.0	121.0	346	328	11.5			
					3.6	120.9	677	590	7.4			
S0010R	S09	20.7	265.4	SM	17.0	133.1	662	652	6.4		35	156
					17.0	133.1	1,325	1,027	6.8			
					16.8	133.0	2,635	2,010	5.6			
S0010R	S12	35.7	250.4	SM	19.3	120.1	1,123	1,192	8.0		39	291
					19.3	120.0	2,246	2,134	3.2			
					19.1	120.1	4,478	3,924	8.0			
S0012R	S02	5.8	281.8	SM	11.1	137.0	173	395	1.0		41	235
					11.5	136.9	346	528	1.2			
					11.0	137.0	677	835	1.6			
S0012R	S07	13.2	274.4	SM	18.6	131.1	446	693	6.4		43	312
					18.6	131.1	878	1,175	4.8			
					18.4	131.1	1,757	1,175	4.4			
S0014R	S02	5.8	278.8	SM	8.2	102.9	158	150	1.6		37	24
					8.1	102.9	317	249	4.5			
					8.0	102.9	634	500	10.5			
S0014R	S11	11.6	273.0	CL-ML	13.8	136.9	331	592	4.1		43	269
					13.9	137.0	662	865	2.9			
					13.7	136.9	1,325	1,509	3.3			

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Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Cohesion Intercept, c' (psf)
								TABLE E-3			
								SUMMARY OF REMOLDED DIRECT SHEAR TEST RESULTS			
S0015R	S02	5.8	280.9	SM	16.2	104.0	158	96	4.1	31	27
					16.1	103.9	317	261	2.9		
					16.4	103.9	634	397	5.8		
S0015R	S09A	20.2	266.5	SM	17.5	133.8	648	655	3.3	41	121
					17.6	133.9	1,296	1,279	4.5		
					17.6	133.9	2,606	648	5.3		
S0016R	S02	5.5	283.3	ML	12.4	119.9	158	279	1.6	37	128
					12.4	119.9	317	317	2.9		
					12.6	119.9	634	618	8.2		
S0016R	S08	35.5	253.3	SP-SM	16.9	125.0	1,224	1,338	4.3	42	360
					16.7	124.5	2,462	2,763	5.1		
					16.7	124.5	4,925	4,732	4.9		
S0016R	S13	60.8	228.0	SM	14.4	122.9	2,117	1,649	9.6	32	312
					14.5	123.0	4,234	2,981	8.8		
					14.5	123.0	8,482	5,662	7.4		
S0016R	S20	95.8	193.0	SM	15.3	137.0	3,384	3,027	4.5	39	298
					15.1	136.9	6,782	5,772	7.8		
					15.0	136.9	13,565	11,244	8.2		
S0016R	S23A	110.4	268.5	SP-SM	13.3	136.9	3,946	3,738	6.7	37	845
					13.2	136.9	7,877	6,862	7.5		
					13.1	137.0	15,768	12,650	6.6		

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										Peak Strength	
TABLE E-3											
SUMMARY OF REMOLDED DIRECT SHEAR TEST RESULTS											
Borehole ID	**Sample No.**	**Depth**	**Elevation (NAVD88)**	**USCS Group**	**Moisture Content, w_o**	**Total Unit Weight, γ_t**	**Normal Stress, σ_n**	**Stress at Failure, τ_{fail}**	**Strain at Failure, ε_{fail}**	**Friction Angle, ϕ'**	**Cohesion Intercept, c'**
		(ft)	**(ft)**		**(%)**	**(pcf)**	**(psf)**	**(psf)**	**(%)**	**(degrees)**	**(psf)**
S0016R	S25	120.8	168.0	CL	15.0	136.9	4,334	3,378	4.5	40	361
					14.8	137.0	8,654	8,569	6.2		
					14.7	137.0	17,323	14,606	7.4		
S0016R	S31	150.8	138.0	SM	31.6	94.0	5,400	4,195	10.7	26	1,637
					31.6	94.0	10,800	6,915	8.2		
					31.6	94.0	21,600	12,028	9.9		
S0017R	S02	5.8	284.7	ML	8.6	125.0	173	207	3.3	36	75
					8.7	124.9	346	323	4.5		
					8.7	124.9	677	577	6.6		
S0017R	S07	30.7	259.8	SM	19.0	130.9	1,066	1,359	4.2	43	344
					18.9	131.0	2,117	2,232	3.8		
					19.0	130.9	4,234	4,248	5.3		
S0017R	S10	45.5	245.0	SM	10.8	132.0	1,570	1,413	4.1	34	353
					10.9	131.9	3,139	2,393	4.5		
					10.8	131.9	6,278	4,514	6.6		
S0017R	S13	60.6	229.9	SM	11.3	121.9	2,117	1,786	6.2	37	84
					11.5	121.9	4,219	3,180	9.9		
					11.1	121.9	8,438	1,426	7.8		
S0017R	S18A	85.3	205.2	SM	11.7	136.9	2,995	2,804	4.1	39	348
					11.7	136.9	6,005	5,253	6.2		
					11.9	137.0	11,995	10,164	6.2		

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									Peak Strength	
Borehole ID	Sample No.	Depth	Elevation (NAVD88)	USCS Group	Moisture Content, w_o	Total Unit Weight, γ_t	Normal Stress, σ_n	Stress at Failure, τ_{fail}	Strain at Failure, ε_{fail}	Friction Angle, ϕ'
		(ft)	(ft)		(%)	(pcf)	(psf)	(psf)	(%)	(degrees)

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength Friction Angle, ϕ' (degrees)	Peak Strength Cohesion Intercept, c' (psf)
S0017R	S21	100.5	190.0	SC	14.0	136.9	3,571	2,962	4.1	37	432
					14.0	136.9	7,142	5,905	7.0		
					14.2	136.9	14,285	10,964	6.2		
S0017R	S24	115.7	174.8	SM	13.5	137.0	4,147	3,322	7.8	38	308
					13.2	136.9	8,280	7,176	6.7		
					13.3	136.9	16,560	13,193	8.2		
S0017R	S30	145.5	145.0	ML	14.3	136.9	5,227	4,324	4.9	32	955
					14.2	136.9	10,440	7,291	7.0		
					14.2	136.9	20,880	14,016	7.0		
S0018R	S02	5.8	300.0	CL-ML	10.1	124.9	173	202	2.1	31	109
					10.3	125.0	346	336	1.6		
					10.1	124.9	677	513	4.1		
S0018R	S04	15.7	290.1	SM	11.7	136.9	533	612	3.7	38	216
					12.1	136.9	1,066	1,087	4.1		
					11.8	137.0	2,117	1,868	3.7		
S0018R	S06	25.6	280.2	CL-ML	20.2	129.0	893	937	4.7	41	117
					20.0	128.9	1,786	1,614	5.3		
					19.8	128.9	3,557	3,244	6.2		
S0018R	S09	40.6	265.2	SP-SM	19.6	130.0	1,397	1,590	3.3	37	533
					19.5	130.0	2,794	2,677	5.8		
					19.8	129.9	5,602	4,800	6.3		

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Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	Moisture Content, w_o (%)	Total Unit Weight, γ_t (pcf)	Normal Stress, σ_n (psf)	Stress at Failure, τ_{fail} (psf)	Strain at Failure, ε_{fail} (%)	Peak Strength	
										Friction Angle, ϕ' (degrees)	Cohesion Intercept, c' (psf)
									TABLE E-3		
									SUMMARY OF REMOLDED DIRECT SHEAR TEST RESULTS		
S0018R	S14	65.4	240.4	SP-SM	13.0	137.0	2,275	2,527	2.5	35	1,080
					12.9	136.8	4,536	4,487	4.1		
					12.6	136.9	9,086	7,384	7.0		
S0018R	S18A	85.7	220.1	ML	15.4	135.9	3,024	2,795	4.1	41	223
					15.5	135.9	6,034	5,524	6.6		
					15.6	135.9	12,082	10,666	6.3		
S0018R	S27	130.5	175.3	SM	17.1	132.9	4,680	3,832	6.6	33	1,080
					17.0	132.9	9,360	7,425	7.8		
					17.2	132.9	18,720	12,925	4.5		
S0018R	S30	145.5	160.3	SM	14.9	137.0	5,227	4,082	6.2	32	837
					14.6	136.8	10,440	7,396	6.6		
					14.8	137.0	20,880	14,016	5.3		
S0019R	S02A	5.4	287.1	SM	11.0	104.9	144	111	2.6	24	40
					11.0	104.9	302	166	5.3		
					10.9	104.9	605	311	7.4		
S0019R	S04B	9.5	283.0	ML	16.8	114.9	245	282	2.9	36	58
					16.7	114.9	504	360	5.4		
					16.9	114.9	994	812	3.8		
S0019R	S08	14.6	277.9	SP	23.4	117.0	403	406	3.0	42	45
					23.7	116.9	806	770	4.5		
					23.8	117.0	1,598	648	4.1		

Results	
C, psi	0.21
φ, deg	34.1
Tan(φ)	0.68

Vertical Deformation, in. — Strain, %

Fail. Stress, psi — Normal Stress, psi

Shear Stress, psi — Strain, %

Sample No.		1	2	3
Initial	Water Content, %	5.3	5.2	5.2
	Dry Density, pcf	102.5	102.6	102.6
	Saturation, %	22.2	21.9	21.8
	Void Ratio	0.6442	0.6429	0.6427
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	23.3	23.2	22.5
	Dry Density, pcf	103.4	103.6	104.9
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.6296	0.6263	0.6071
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.99	0.98
Normal Stress, psi		1.70	3.50	6.90
Fail. Stress, psi		1.36	2.59	4.88
Strain, %		6.7	12.1	11.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0001R, S04
Sample Number: S36224   **Depth:** 8-9.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: js_____   **Checked By:** mpw_____

Date:
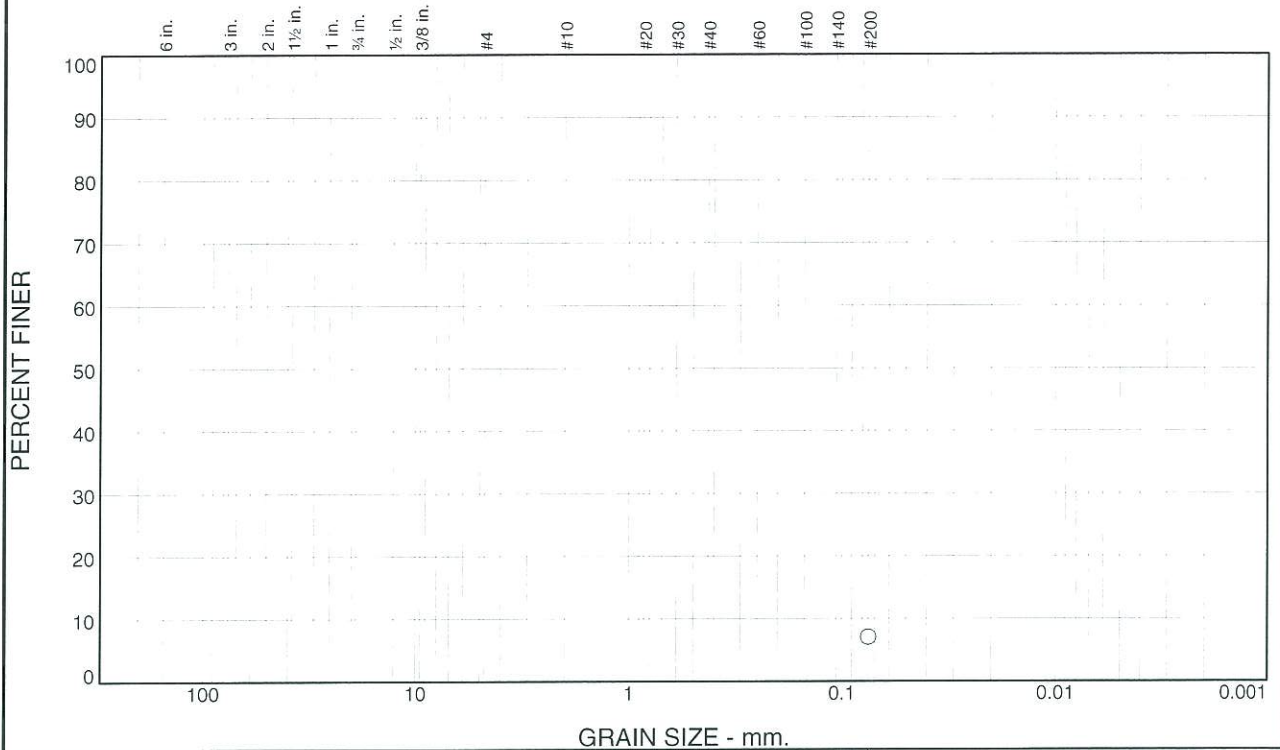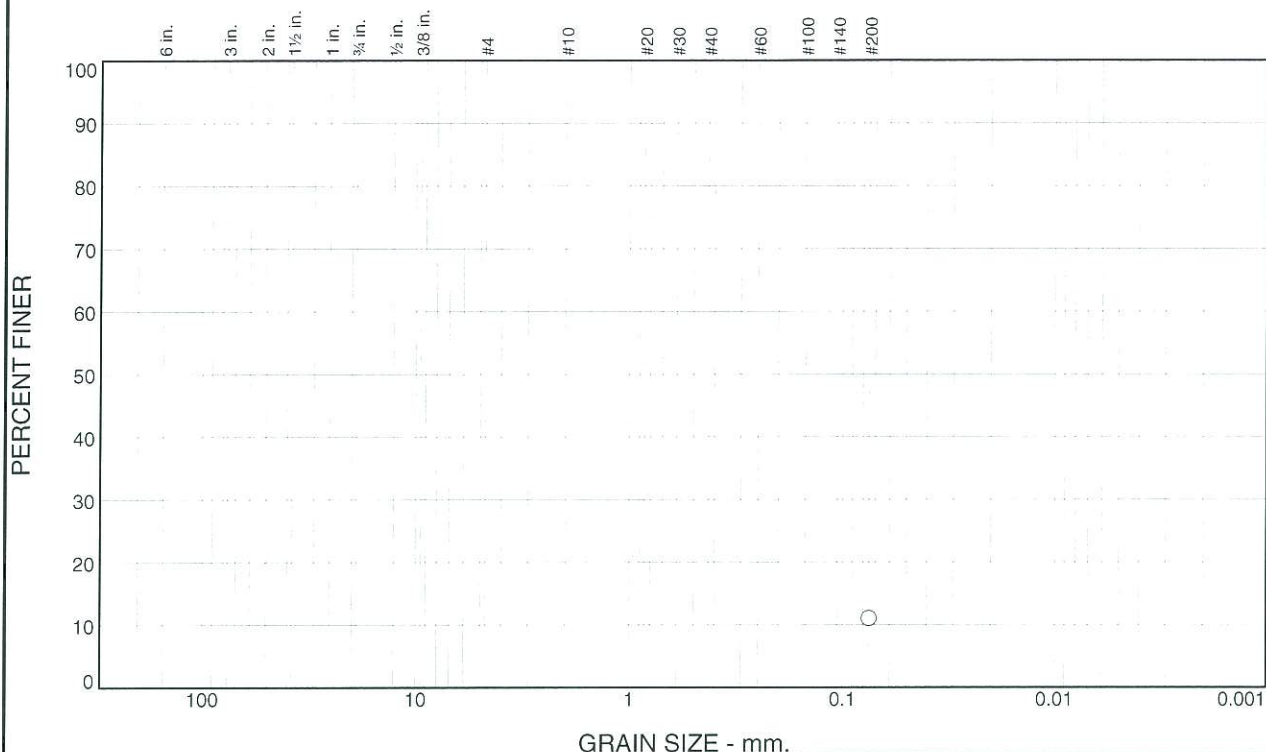**Client:**   URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0001R, S04
Depth: 8-9.5   **Sample Number:**   S36224
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2328.000		2350.500
Moisture content: Dry soil+tare, gms.	2321.400		2321.400
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	5.3	23.3	23.3
Moist specimen weight, gms.	131.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	107.9	127.6	
Dry density, pcf	102.5	103.4	
Void ratio	0.6442	0.6296	
Saturation, %	22.2	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 1.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.36 psi **at reading no.** 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	1.900	2.3	0.2	0.50	0.3004
2	0.0150	2.000	2.5	0.6	0.53	0.3010
3	0.0200	2.700	3.3	0.8	0.72	0.3010
4	0.0300	3.100	3.8	1.2	0.82	0.3013
5	0.0400	3.600	4.4	1.6	0.96	0.3017
6	0.0500	4.100	5.1	2.1	1.09	0.3024
7	0.0600	4.300	5.3	2.5	1.14	0.3026
8	0.0700	4.400	5.4	2.9	1.17	0.3030
9	0.0800	4.500	5.5	3.3	1.20	0.3031
10	0.0900	4.600	5.7	3.7	1.22	0.3030
11	0.1000	4.800	5.9	4.1	1.28	0.3032

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	4.700	5.8	4.5	1.25	0.3034
13	0.1200	4.900	6.0	4.9	1.30	0.3033
14	0.1300	4.800	5.9	5.3	1.28	0.3036
15	0.1400	5.000	6.2	5.8	1.33	0.3040
16	0.1550	5.000	6.2	6.4	1.33	0.3040
17	0.1630	5.100	6.3	6.7	1.36	0.3042
18	0.1700	5.000	6.2	7.0	1.33	0.3041
19	0.1800	4.800	5.9	7.4	1.28	0.3040
20	0.1900	4.900	6.0	7.8	1.30	0.3041
21	0.2000	4.000	4.9	8.2	1.06	0.3050
22	0.2100	3.600	4.4	8.6	0.96	0.3051
23	0.2200	3.400	4.2	9.1	0.90	0.3053

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2343.800		2366.250
Moisture content: Dry soil+tare, gms.	2337.300		2337.300
Moisture content: Tare, gms.	2212.400		2212.400
Moisture, %	5.2	23.2	23.2
Moist specimen weight, gms.	131.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	107.9	127.7	
Dry density, pcf	102.6	103.6	
Void ratio	0.6429	0.6263	
Saturation, %	21.9	99.9	

Load ring constant = 1.000 lbs. per input unit

Normal stress = 3.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.59 psi **at reading no.** 30

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	2.900	2.9	0.2	0.63	0.2991
2	0.0100	4.000	4.0	0.4	0.86	0.2990
3	0.0200	4.800	4.8	0.8	1.03	0.2989
4	0.0300	5.100	5.1	1.2	1.10	0.2986
5	0.0400	6.000	6.0	1.6	1.29	0.2984
6	0.0500	5.900	5.9	2.1	1.27	0.2981
7	0.0600	6.000	6.0	2.5	1.29	0.2980
8	0.0700	6.700	6.7	2.9	1.44	0.2979
9	0.0800	7.800	7.8	3.3	1.68	0.2949
10	0.0930	9.500	9.5	3.8	2.05	0.2941
11	0.1000	9.400	9.4	4.1	2.03	0.2925

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1150	10.000	10.0	4.7	2.16	0.2921
13	0.1200	10.300	10.3	4.9	2.22	0.2920
14	0.1320	10.800	10.8	5.4	2.33	0.2920
15	0.1400	10.100	10.1	5.8	2.18	0.2920
16	0.1500	10.800	10.8	6.2	2.33	0.2921
17	0.1620	10.200	10.2	6.7	2.20	0.2921
18	0.1710	10.700	10.7	7.0	2.31	0.2921
19	0.1860	10.600	10.6	7.7	2.29	0.2920
20	0.1930	10.500	10.5	7.9	2.26	0.2920
21	0.2000	10.700	10.7	8.2	2.31	0.2912
22	0.2170	11.000	11.0	8.9	2.37	0.2909
23	0.2200	11.000	11.0	9.1	2.37	0.2909
24	0.2330	10.800	10.8	9.6	2.33	0.2910
25	0.2400	11.000	11.0	9.9	2.37	0.2910
26	0.2500	11.000	11.0	10.3	2.37	0.2910
27	0.2600	11.000	11.0	10.7	2.37	0.2910
28	0.2700	11.000	11.0	11.1	2.37	0.2910
29	0.2820	11.600	11.6	11.6	2.50	0.2900
30	0.2930	12.000	12.0	12.1	2.59	0.2901
31	0.3000	12.000	12.0	12.3	2.59	0.2901
32	0.3120	11.800	11.8	12.8	2.54	0.2902
33	0.3220	12.000	12.0	13.3	2.59	0.2902
34	0.3320	12.000	12.0	13.7	2.59	0.2902
35	0.3400	11.900	11.9	14.0	2.57	0.2901
36	0.3500	11.900	11.9	14.4	2.57	0.2901
37	0.3600	11.600	11.6	14.8	2.50	0.2900

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2336.300		2359.250
Moisture content: Dry soil+tare, gms.	2329.400		2329.400
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	5.2	22.5	22.5
Moist specimen weight, gms.	131.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	107.9	128.5	
Dry density, pcf	102.6	104.9	
Void ratio	0.6427	0.6071	
Saturation, %	21.8	100.0	

Load ring constant = .8988 lbs. per input unit

Normal stress = 6.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 4.88 psi at reading no. 28

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.000	4.5	0.2	0.97	0.2995
2	0.0100	7.200	6.5	0.4	1.40	0.2990
3	0.0200	11.000	9.9	0.8	2.13	0.2980
4	0.0300	14.800	13.3	1.2	2.87	0.2976
5	0.0480	19.500	17.5	2.0	3.78	0.2969
6	0.0500	20.000	18.0	2.1	3.88	0.2969
7	0.0600	20.000	18.0	2.5	3.88	0.2967
8	0.0710	20.400	18.3	2.9	3.95	0.2967
9	0.0800	19.900	17.9	3.3	3.86	0.2967
10	0.0920	20.100	18.1	3.8	3.90	0.2968
11	0.1040	20.900	18.8	4.3	4.05	0.2969
12	0.1100	21.100	19.0	4.5	4.09	0.2969
13	0.1200	21.400	19.2	4.9	4.15	0.2969
14	0.1300	21.800	19.6	5.3	4.22	0.2970
15	0.1400	22.400	20.1	5.8	4.34	0.2970
16	0.1520	23.000	20.7	6.3	4.46	0.2970
17	0.1600	23.800	21.4	6.6	4.61	0.2970
18	0.1700	23.100	20.8	7.0	4.48	0.2970
19	0.1800	24.000	21.6	7.4	4.65	0.2969
20	0.1900	24.200	21.8	7.8	4.69	0.2968
21	0.2000	24.600	22.1	8.2	4.77	0.2968
22	0.2110	25.100	22.6	8.7	4.86	0.2968
23	0.2200	25.000	22.5	9.1	4.85	0.2969
24	0.2320	25.000	22.5	9.5	4.85	0.2969
25	0.2400	25.000	22.5	9.9	4.85	0.2969
26	0.2520	25.000	22.5	10.4	4.85	0.2969
27	0.2600	25.100	22.6	10.7	4.86	0.2969

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
28	0.2730	25.200	22.6	11.2	4.88	0.2969
29	0.2800	24.600	22.1	11.5	4.77	0.2968
30	0.2940	24.600	22.1	12.1	4.77	0.2968
31	0.3000	24.500	22.0	12.3	4.75	0.2968
32	0.3110	25.000	22.5	12.8	4.85	0.2968
33	0.3200	24.000	21.6	13.2	4.65	0.2966
34	0.3310	24.100	21.7	13.6	4.67	0.2963
35	0.3400	24.100	21.7	14.0	4.67	0.2963
36	0.3500	24.600	22.1	14.4	4.77	0.2963
37	0.3600	25.000	22.5	14.8	4.85	0.2962

Results

	Results
C, psi	0.05
φ, deg	37.9
Tan(φ)	0.78

Vertical Deformation, in. vs **Strain, %**

Fail. Stress, psi vs **Normal Stress, psi**

Shear Stress, psi vs **Strain, %**
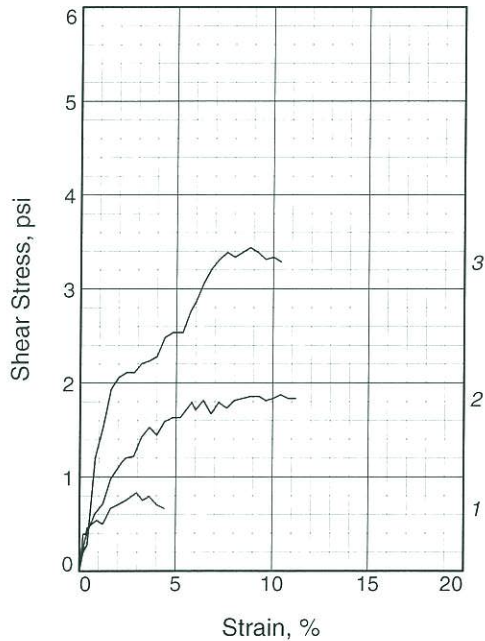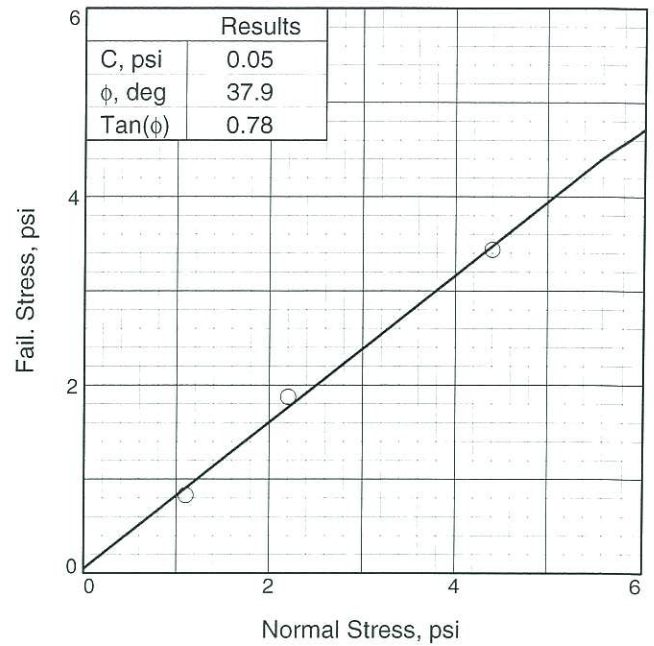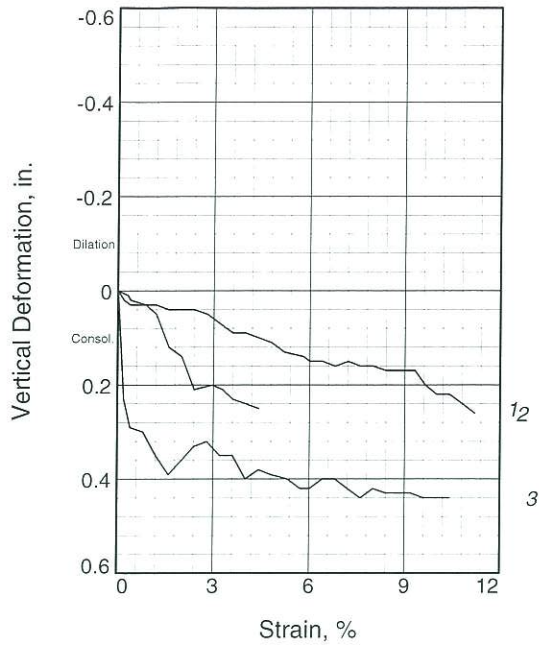
Sample No.		1	2	3
Initial	Water Content, %	2.8	2.8	2.7
	Dry Density, pcf	111.9	111.9	112.1
	Saturation, %	15.2	15.2	14.5
	Void Ratio	0.5062	0.5062	0.5041
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.2	12.1	14.0
	Dry Density, pcf	115.2	127.2	122.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.4634	0.3254	0.3777
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.97	0.88	0.92
Normal Stress, psi		1.10	2.20	4.40
Fail. Stress, psi		0.83	1.87	3.44
Strain, %		3.0	10.4	8.8
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0002R, S02
Sample Number: S36229   **Depth:** 5-6.3
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw _____   **Checked By:** mpw _____

Date:
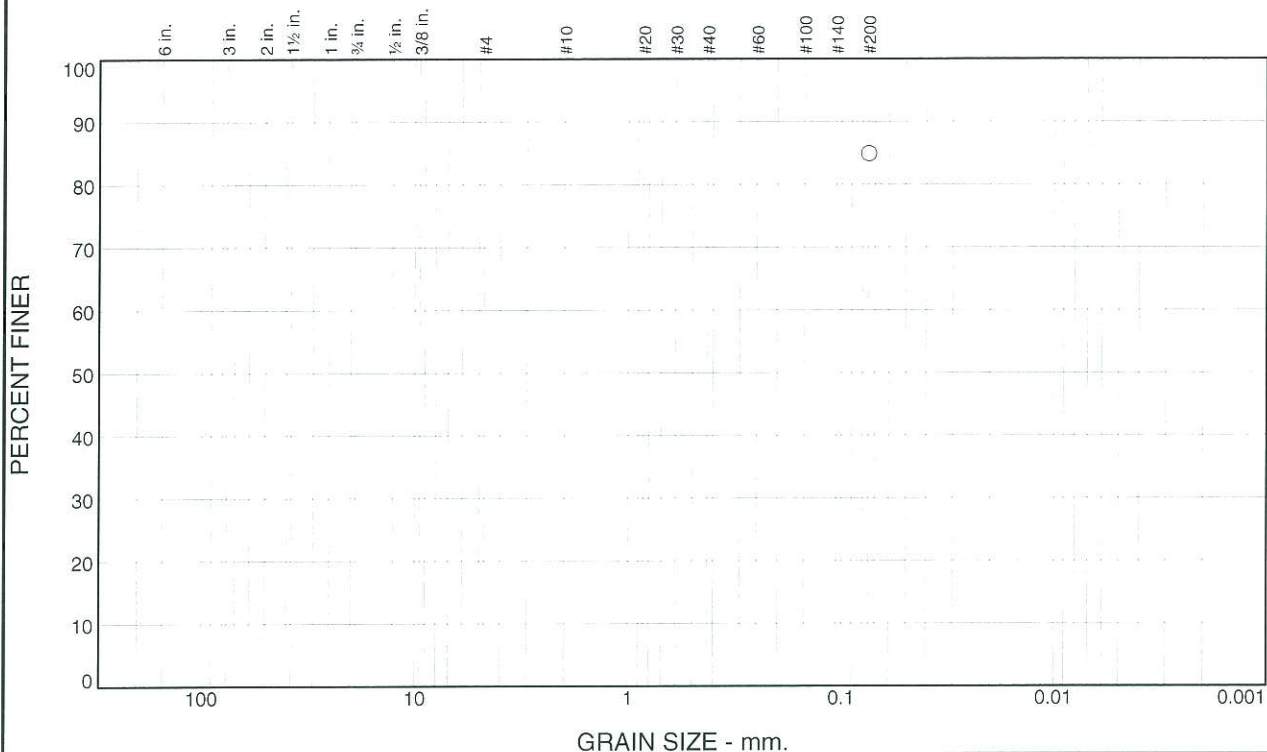
Client: URS / HMM/ ARUP

Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019

Project No.:   11-111

Location: S0002R, S02

Depth: 5-6.3   **Sample Number:**   S36229

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3434.100		3454.750
Moisture content: Dry soil+tare, gms.	3430.000		3430.000
Moisture content: Tare, gms.	3285.800		3285.800
Moisture, %	2.8	17.2	17.2
Moist specimen weight, gms.	148.3		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	115.1	135.0	
Dry density, pcf	111.9	115.2	
Void ratio	0.5062	0.4634	
Saturation, %	15.2	100.0	

Test Readings for Specimen No. 1

Load ring constant = 2.0432 lbs. per input unit

Normal stress = 1.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 0.83 psi **at reading no.** 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0080	0.900	1.8	0.3	0.37	-0.0100
2	0.0100	1.100	2.2	0.4	0.46	-0.0200
3	0.0220	1.300	2.7	0.9	0.54	-0.0300
4	0.0300	1.200	2.5	1.2	0.50	-0.0500
5	0.0400	1.600	3.3	1.6	0.67	-0.1200
6	0.0500	1.700	3.5	2.0	0.71	-0.1400
7	0.0600	1.800	3.7	2.4	0.75	-0.2100
8	0.0740	2.000	4.1	3.0	0.83	-0.2000
9	0.0820	1.800	3.7	3.3	0.75	-0.2100
10	0.0900	1.900	3.9	3.6	0.79	-0.2300
11	0.1000	1.700	3.5	4.0	0.71	-0.2400

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	1.600	3.3	4.4	0.67	-0.2500

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3434.100		3447.380
Moisture content: Dry soil+tare, gms.	3430.000		3430.000
Moisture content: Tare, gms.	3285.800		3285.800
Moisture, %	2.8	12.1	12.1
Moist specimen weight, gms.	148.3		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.88	
Net decrease in height, in.		0.12	
Wet density, pcf	115.1	142.5	
Dry density, pcf	111.9	127.2	
Void ratio	0.5062	0.3254	
Saturation, %	15.2	100.0	

Normal stress = 2.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.87 psi at reading no. 27

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	1.900	1.9	0.2	0.39	-0.0200
2	0.0100	2.000	2.0	0.4	0.41	-0.0300
3	0.0200	3.000	3.0	0.8	0.61	-0.0300
4	0.0300	3.500	3.5	1.2	0.71	-0.0300
5	0.0400	4.800	4.8	1.6	0.98	-0.0400
6	0.0550	5.700	5.7	2.2	1.16	-0.0400
7	0.0600	5.900	5.9	2.4	1.20	-0.0400
8	0.0700	6.000	6.0	2.8	1.22	-0.0500
9	0.0800	7.000	7.0	3.2	1.43	-0.0700
10	0.0900	7.500	7.5	3.6	1.53	-0.0900
11	0.1000	7.100	7.1	4.0	1.45	-0.0900
12	0.1100	7.800	7.8	4.4	1.59	-0.1000
13	0.1200	8.000	8.0	4.8	1.63	-0.1100
14	0.1300	8.000	8.0	5.2	1.63	-0.1300
15	0.1450	8.800	8.8	5.8	1.79	-0.1400
16	0.1500	8.400	8.4	6.0	1.71	-0.1500
17	0.1600	8.900	8.9	6.4	1.81	-0.1500
18	0.1700	8.200	8.2	6.8	1.67	-0.1600
19	0.1800	8.800	8.8	7.2	1.79	-0.1500
20	0.1900	8.500	8.5	7.6	1.73	-0.1600
21	0.2000	8.900	8.9	8.0	1.81	-0.1600
22	0.2100	9.000	9.0	8.4	1.83	-0.1700
23	0.2200	9.100	9.1	8.8	1.85	-0.1700

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
24	0.2330	9.100	9.1	9.3	1.85	-0.1700
25	0.2410	8.900	8.9	9.6	1.81	-0.2000
26	0.2500	9.000	9.0	10.0	1.83	-0.2200
27	0.2600	9.200	9.2	10.4	1.87	-0.2200
28	0.2700	9.000	9.0	10.8	1.83	-0.2400
29	0.2800	9.000	9.0	11.2	1.83	-0.2600

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3434.100		3450.400
Moisture content: Dry soil+tare, gms.	3430.200		3430.200
Moisture content: Tare, gms.	3285.800		3285.800
Moisture, %	2.7	14.0	14.0
Moist specimen weight, gms.	148.3		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.92	
Net decrease in height, in.		0.08	
Wet density, pcf	115.1	139.5	
Dry density, pcf	112.1	122.3	
Void ratio	0.5041	0.3777	
Saturation, %	14.5	100.0	

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 4.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.44 psi at reading no. 23

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	0.800	1.0	0.2	0.20	-0.2300
2	0.0100	1.100	1.4	0.4	0.28	-0.2900
3	0.0200	4.800	5.9	0.8	1.20	-0.3000
4	0.0300	6.100	7.5	1.2	1.53	-0.3500
5	0.0400	7.700	9.5	1.6	1.93	-0.3900
6	0.0500	8.200	10.1	2.0	2.06	-0.3600
7	0.0600	8.400	10.4	2.4	2.11	-0.3300
8	0.0700	8.400	10.4	2.8	2.11	-0.3200
9	0.0800	8.800	10.8	3.2	2.21	-0.3500
10	0.0900	8.900	11.0	3.6	2.23	-0.3500
11	0.1000	9.100	11.2	4.0	2.28	-0.4000
12	0.1100	9.900	12.2	4.4	2.49	-0.3800
13	0.1200	10.100	12.4	4.8	2.54	-0.3900
14	0.1330	10.100	12.4	5.3	2.54	-0.4000
15	0.1430	11.000	13.6	5.7	2.76	-0.4200
16	0.1500	11.400	14.0	6.0	2.86	-0.4200
17	0.1600	12.200	15.0	6.4	3.06	-0.4000

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
18	0.1700	12.800	15.8	6.8	3.21	-0.4000
19	0.1800	13.200	16.3	7.2	3.31	-0.4200
20	0.1900	13.500	16.6	7.6	3.39	-0.4400
21	0.2000	13.300	16.4	8.0	3.34	-0.4200
22	0.2100	13.500	16.6	8.4	3.39	-0.4300
23	0.2200	13.700	16.9	8.8	3.44	-0.4300
24	0.2300	13.500	16.6	9.2	3.39	-0.4300
25	0.2400	13.200	16.3	9.6	3.31	-0.4400
26	0.2500	13.300	16.4	10.0	3.34	-0.4400
27	0.2600	13.100	16.1	10.4	3.29	-0.4400

Vertical Deformation, in. vs Strain, % (top left graph)
- Y-axis: -0.045, -0.03, -0.015, 0, 0.015, 0.03, 0.045
- Dilation, Consol.
- X-axis: Strain, %: 0, 1.5, 3, 4.5, 6
- Curves labeled 1, 23

Fail. Stress, psi vs Normal Stress, psi (top right graph)
- Y-axis: 0, 3, 6, 9
- X-axis: 0, 3, 6, 9

Results	
C, psi	2.61
φ, deg	41.1
Tan(φ)	0.87

Shear Stress, psi vs Strain, % (bottom left graph)
- Y-axis: 0, 1.5, 3, 4.5, 6, 7.5, 9
- X-axis: Strain, %: 0, 1.5, 3, 4.5, 6
- Curves labeled 1, 2, 3

	Sample No.	1	2	3
Initial	Water Content, %	19.0	19.0	19.2
	Dry Density, pcf	105.0	105.0	104.8
	Saturation, %	84.8	84.8	85.3
	Void Ratio	0.6056	0.6056	0.6081
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	22.7	21.8	21.7
	Dry Density, pcf	104.6	106.0	106.1
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.6119	0.5900	0.5880
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
	Normal Stress, psi	1.50	3.10	6.10
	Fail. Stress, psi	3.99	5.20	7.97
	Strain, %	2.1	2.3	2.2
	Ult. Stress, psi			
	Strain, %			
	Strain rate, in./min.	0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
 Fresno to Bakersfield Geotech Investigation
Location: S0003R, S04
Sample Number: S36233 **Depth:** 8-9.0
Proj. No.: 11-111 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: js   **Checked By:** mpw

Date:
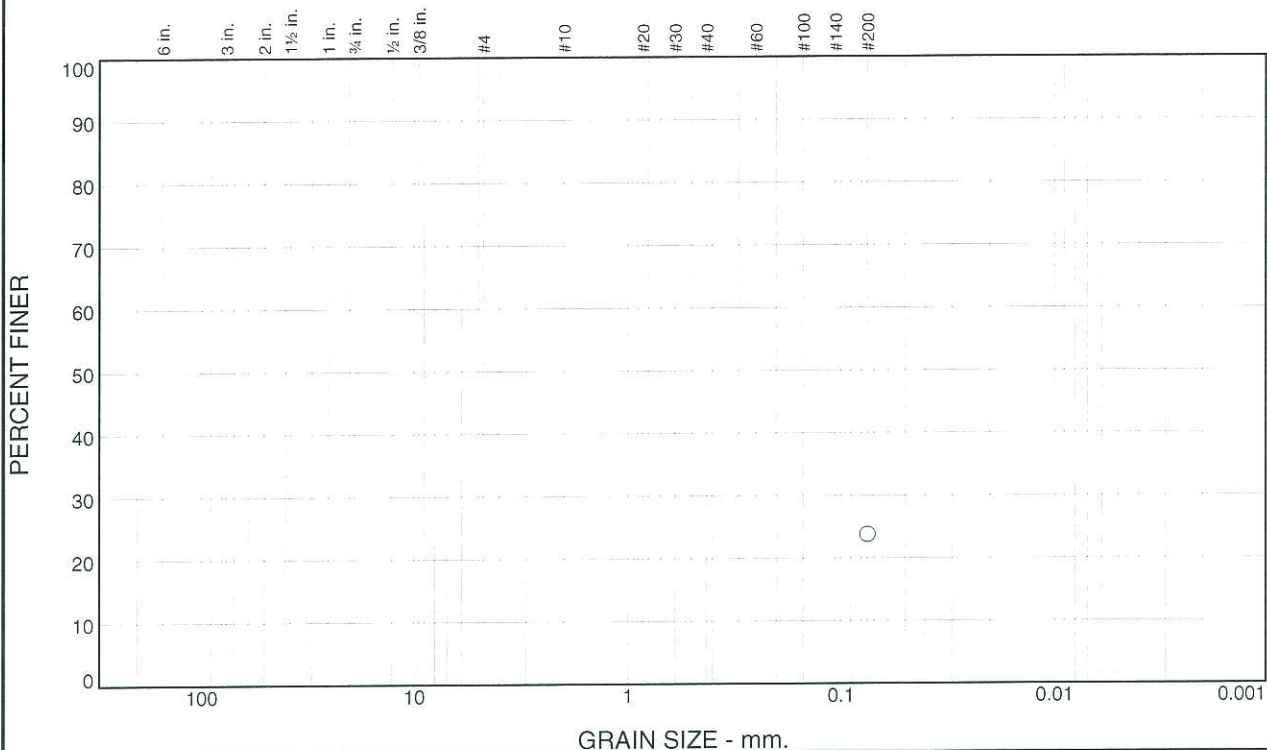**Client:**   URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0003R, S04
Depth: 8-9.0   **Sample Number:**   S36233
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen no. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2348.300		2352.950
Moisture content: Dry soil+tare, gms.	2324.000		2324.000
Moisture content: Tare, gms.	2196.200		2196.200
Moisture, %	19.0	22.7	22.7
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	124.9	128.3	
Dry density, pcf	105.0	104.6	
Void ratio	0.6056	0.6119	
Saturation, %	84.8	100.0	

Test Readings for Specimen No. 1

Load ring constant = .8988 lbs. per input unit
Normal stress = 1.5 psi
Strain rate, in./min. = 0.03
Fail. Stress = 3.99 psi at reading no. 6

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	8.000	7.2	0.2	1.55	0.3003
2	0.0100	12.000	10.8	0.4	2.33	0.3019
3	0.0200	16.100	14.5	0.8	3.12	0.3041
4	0.0300	18.900	17.0	1.2	3.66	0.3065
5	0.0400	19.700	17.7	1.6	3.82	0.3100
6	0.0500	20.600	18.5	2.1	3.99	0.3140
7	0.0600	20.400	18.3	2.5	3.95	0.3180
8	0.0750	18.900	17.0	3.1	3.66	0.3235
9	0.0800	18.000	16.2	3.3	3.49	0.3250
10	0.0940	17.000	15.3	3.9	3.29	0.3289

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2365.000		2368.600
Moisture content: Dry soil+tare, gms.	2340.700		2340.700
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	19.0	21.8	21.8
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.9	129.2	
Dry density, pcf	105.0	106.0	
Void ratio	0.6056	0.5900	
Saturation, %	84.8	99.9	

Normal stress = 3.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 5.20 psi **at reading no.** 6

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.200	7.2	0.2	1.55	0.2999
2	0.0100	11.000	11.0	0.4	2.37	0.3000
3	0.0200	18.000	18.0	0.8	3.88	0.3011
4	0.0300	21.800	21.8	1.2	4.70	0.3030
5	0.0400	23.800	23.8	1.6	5.13	0.3047
6	0.0570	24.100	24.1	2.3	5.20	0.3081
7	0.0610	23.700	23.7	2.5	5.11	0.3092
8	0.0700	23.100	23.1	2.9	4.98	0.3108
9	0.0870	23.000	23.0	3.6	4.96	0.3136
10	0.0900	23.000	23.0	3.7	4.96	0.3139

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2348.300		2351.550
Moisture content: Dry soil+tare, gms.	2323.800		2323.800
Moisture content: Tare, gms.	2196.200		2196.200
Moisture, %	19.2	21.7	21.7
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.9	129.2	
Dry density, pcf	104.8	106.1	
Void ratio	0.6081	0.5880	
Saturation, %	85.3	99.9	

Load ring constant = .8988 lbs. per input unit

Normal stress = 6.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 7.97 psi **at reading no.** 6

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	6.100	5.5	0.2	1.18	0.2996
2	0.0100	15.100	13.6	0.4	2.93	0.2991
3	0.0200	26.100	23.5	0.8	5.06	0.2996
4	0.0300	34.100	30.6	1.2	6.61	0.3009
5	0.0450	39.500	35.5	1.9	7.66	0.3036
6	0.0530	41.100	36.9	2.2	7.97	0.3052
7	0.0620	41.000	36.9	2.6	7.95	0.3074
8	0.0700	40.500	36.4	2.9	7.85	0.3090
9	0.0800	39.900	35.9	3.3	7.73	0.3108
10	0.0900	38.800	34.9	3.7	7.52	0.3122
11	0.1060	37.200	33.4	4.4	7.21	0.3139
12	0.1100	37.200	33.4	4.5	7.21	0.3140

Results	
C, psi	2.53
φ, deg	41.1
Tan(φ)	0.87
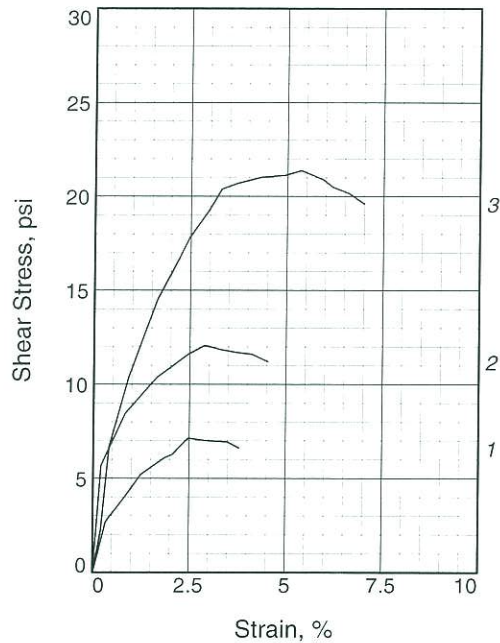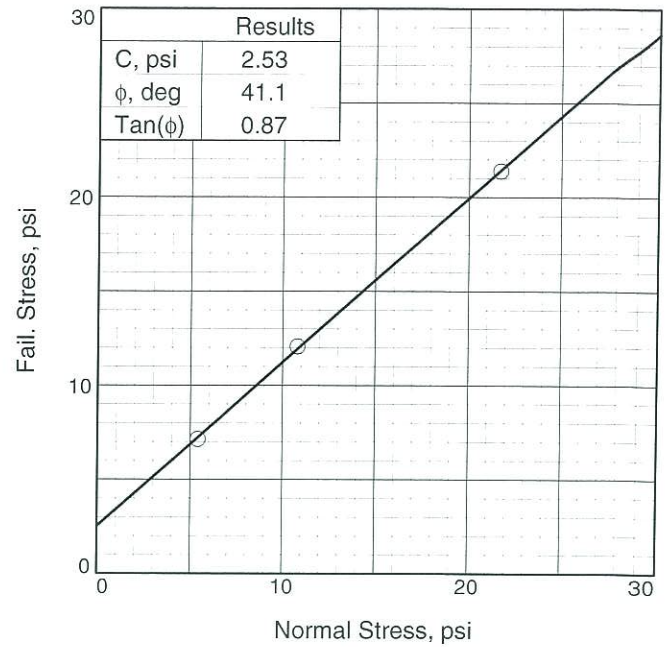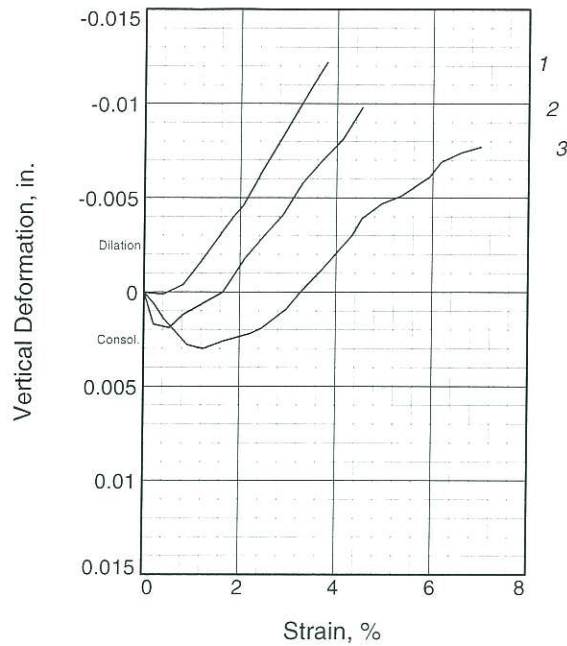
Sample No.		1	2	3
Initial	Water Content, %	18.0	17.8	18.3
	Dry Density, pcf	103.3	103.5	103.0
	Saturation, %	76.9	76.4	77.8
	Void Ratio	0.6311	0.6285	0.6363
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	22.0	21.9	21.4
	Dry Density, pcf	105.8	105.9	106.8
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.5936	0.5911	0.5781
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.98	0.96
Normal Stress, psi		5.40	10.80	21.70
Fail. Stress, psi		7.15	12.07	21.39
Strain, %		2.5	2.9	5.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0003R, S10
Sample Number: S36235   **Depth:** 25-26.4
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.: 11-111

Location: S0003R, S10

Depth: 25-26.4   **Sample Number:** S36235

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2360.900		2365.950
Moisture content: Dry soil+tare, gms.	2338.300		2338.300
Moisture content: Tare, gms.	2212.500		2212.500
Moisture, %	18.0	22.0	22.0
Moist specimen weight, gms.	148.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	121.9	129.0	
Dry density, pcf	103.3	105.8	
Void ratio	0.6311	0.5936	
Saturation, %	76.9	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 5.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 7.15 psi **at reading no.** 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0080	10.000	12.3	0.3	2.66	0.2999
2	0.0100	11.000	13.6	0.4	2.92	0.2999
3	0.0200	15.100	18.6	0.8	4.01	0.3004
4	0.0300	19.600	24.2	1.2	5.21	0.3018
5	0.0450	23.000	28.3	1.9	6.11	0.3040
6	0.0500	23.600	29.1	2.1	6.27	0.3046
7	0.0600	26.900	33.1	2.5	7.15	0.3065
8	0.0700	26.400	32.5	2.9	7.01	0.3083
9	0.0850	26.100	32.2	3.5	6.93	0.3110
10	0.0920	24.900	30.7	3.8	6.62	0.3122

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2345.200		2350.350
Moisture content: Dry soil+tare, gms.	2322.800		2322.800
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	17.8	21.9	21.9
Moist specimen weight, gms.	148.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	121.9	129.1	
Dry density, pcf	103.5	105.9	
Void ratio	0.6285	0.5911	
Saturation, %	76.4	99.9	

Normal stress = 10.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 12.07 psi at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	26.300	26.3	0.2	5.67	0.2983
2	0.0130	33.100	33.1	0.5	7.14	0.2981
3	0.0200	39.200	39.2	0.8	8.45	0.2988
4	0.0350	46.000	46.0	1.4	9.92	0.2997
5	0.0400	48.100	48.1	1.6	10.37	0.3000
6	0.0510	51.300	51.3	2.1	11.06	0.3018
7	0.0600	53.900	53.9	2.5	11.62	0.3029
8	0.0700	56.000	56.0	2.9	12.07	0.3041
9	0.0800	55.000	55.0	3.3	11.86	0.3058
10	0.0900	54.300	54.3	3.7	11.71	0.3070
11	0.1000	53.800	53.8	4.1	11.60	0.3081
12	0.1100	52.000	52.0	4.5	11.21	0.3098

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2360.900		2364.750
Moisture content: Dry soil+tare, gms.	2337.900		2337.900
Moisture content: Tare, gms.	2212.500		2212.500
Moisture, %	18.3	21.4	21.4
Moist specimen weight, gms.	148.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	121.9	129.7	
Dry density, pcf	103.0	106.8	
Void ratio	0.6363	0.5781	
Saturation, %	77.8	100.0	

Normal stress = 21.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 21.39 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	10.300	10.3	0.2	2.22	0.2994
2	0.0100	31.100	31.1	0.4	6.71	0.2986
3	0.0220	48.100	48.1	0.9	10.37	0.2972
4	0.0300	56.700	56.7	1.2	12.23	0.2970
5	0.0400	67.400	67.4	1.6	14.53	0.2974
6	0.0540	77.800	77.8	2.2	16.78	0.2978
7	0.0600	82.600	82.6	2.5	17.81	0.2981
8	0.0720	89.200	89.2	3.0	19.23	0.2991
9	0.0800	94.600	94.6	3.3	20.40	0.3001
10	0.0900	96.000	96.0	3.7	20.70	0.3012
11	0.1050	97.500	97.5	4.3	21.02	0.3030
12	0.1100	97.700	97.7	4.5	21.07	0.3039
13	0.1200	98.000	98.0	4.9	21.13	0.3047
14	0.1300	99.200	99.2	5.3	21.39	0.3051
15	0.1440	96.900	96.9	5.9	20.89	0.3061
16	0.1500	95.100	95.1	6.2	20.51	0.3069
17	0.1600	93.600	93.6	6.6	20.18	0.3074
18	0.1700	91.000	91.0	7.0	19.62	0.3077

Results	
C, psi	3.11
φ, deg	41.8
Tan(φ)	0.89

Vertical Deformation, in. vs **Strain, %** (top left graph, curves labeled 1, 2, 3; Dilation / Consol.)

Fail. Stress, psi vs **Normal Stress, psi** (top right graph)

Shear Stress, psi vs **Strain, %** (bottom left graph, curves labeled 1, 2, 3)
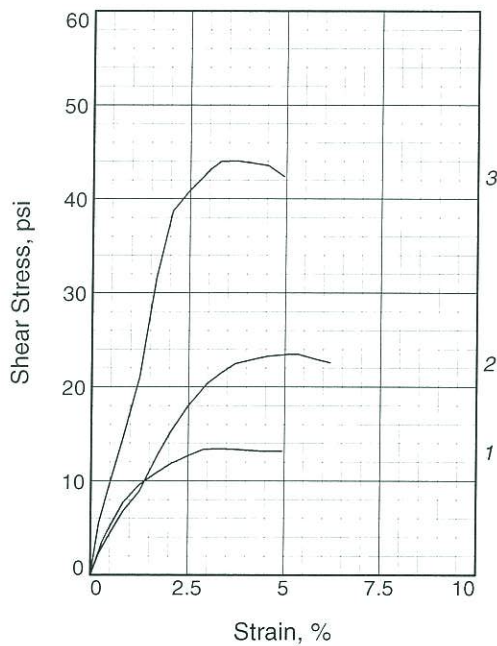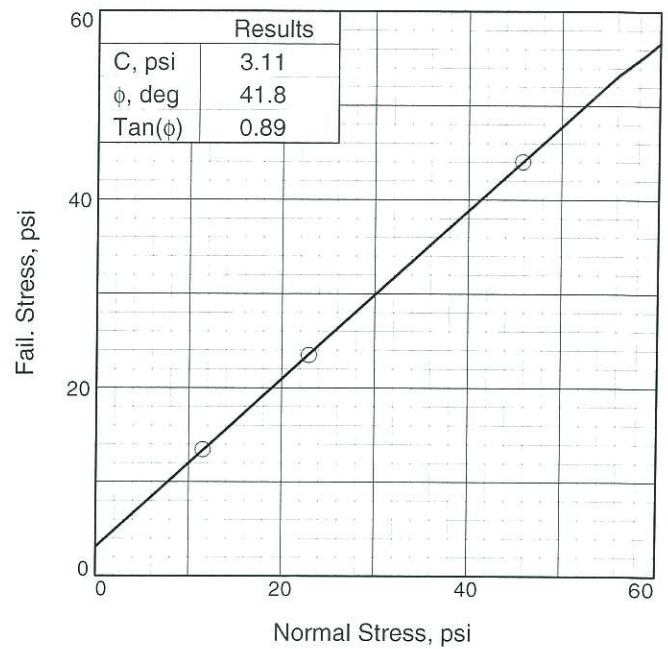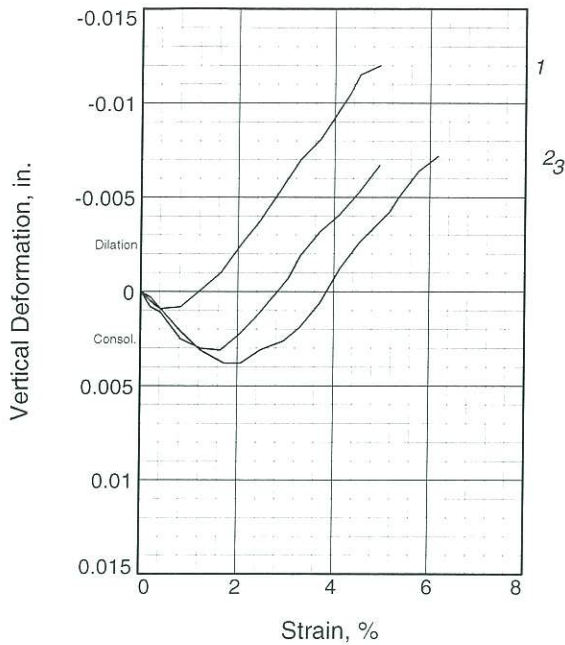
Sample No.		1	2	3
Initial	Water Content, %	10.3	10.3	10.3
	Dry Density, pcf	118.7	118.7	118.7
	Saturation, %	66.3	66.3	66.3
	Void Ratio	0.4200	0.4200	0.4200
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	14.6	14.3	13.9
	Dry Density, pcf	120.8	121.6	122.6
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.3953	0.3860	0.3745
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.98	0.97
Normal Stress, psi		11.50	22.90	45.80
Fail. Stress, psi		13.43	23.50	44.05
Strain, %		3.3	5.1	3.7
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0003R, S15
Sample Number: S36237   **Depth:** 50-50.8
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:
**Client:**   URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0003R, S15
Depth: 50-50.8   **Sample Number:**   S36237
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2356.600		2362.850
Moisture content: Dry soil+tare, gms.	2341.700		2341.700
Moisture content: Tare, gms.	2197.200		2197.200
Moisture, %	10.3	14.6	14.6
Moist specimen weight, gms.	159.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	130.9	138.5	
Dry density, pcf	118.7	120.8	
Void ratio	0.4200	0.3953	
Saturation, %	66.3	100.0	

Test Readings for Specimen No. 1

Normal stress = 11.5 psi
Strain rate, in./min. = 0.03
Fail. Stress = 13.43 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0070	16.100	16.1	0.3	3.47	0.2993
2	0.0100	21.000	21.0	0.4	4.53	0.2991
3	0.0200	35.600	35.6	0.8	7.68	0.2992
4	0.0300	44.500	44.5	1.2	9.60	0.3001
5	0.0400	50.000	50.0	1.6	10.78	0.3010
6	0.0500	55.000	55.0	2.1	11.86	0.3025
7	0.0600	58.700	58.7	2.5	12.66	0.3038
8	0.0700	62.000	62.0	2.9	13.37	0.3054
9	0.0800	62.300	62.3	3.3	13.43	0.3070
10	0.0900	61.900	61.9	3.7	13.35	0.3081
11	0.1050	61.200	61.2	4.3	13.20	0.3105
12	0.1100	61.100	61.1	4.5	13.17	0.3115

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	61.000	61.0	4.9	13.15	0.3120

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2372.300		2378.050
Moisture content: Dry soil+tare, gms.	2357.400		2357.400
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	10.3	14.3	14.3
Moist specimen weight, gms.	159.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	130.9	139.0	
Dry density, pcf	118.7	121.6	
Void ratio	0.4200	0.3860	
Saturation, %	66.3	100.0	

Normal stress = 22.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 23.50 psi at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	10.500	10.5	0.2	2.26	0.2997
2	0.0100	17.700	17.7	0.4	3.82	0.2991
3	0.0200	31.300	31.3	0.8	6.75	0.2979
4	0.0300	41.100	41.1	1.2	8.86	0.2969
5	0.0420	60.100	60.1	1.7	12.96	0.2962
6	0.0500	71.200	71.2	2.1	15.35	0.2962
7	0.0600	83.000	83.0	2.5	17.90	0.2969
8	0.0720	94.200	94.2	3.0	20.31	0.2974
9	0.0800	99.100	99.1	3.3	21.37	0.2981
10	0.0900	104.300	104.3	3.7	22.49	0.2994
11	0.1000	106.200	106.2	4.1	22.90	0.3012
12	0.1100	107.900	107.9	4.5	23.27	0.3026
13	0.1250	109.000	109.0	5.1	23.50	0.3042
14	0.1300	108.800	108.8	5.3	23.46	0.3050
15	0.1400	106.700	106.7	5.8	23.01	0.3064
16	0.1500	104.800	104.8	6.2	22.60	0.3072

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2356.600		2361.750
Moisture content: Dry soil+tare, gms.	2341.700		2341.700
Moisture content: Tare, gms.	2197.200		2197.200
Moisture, %	10.3	13.9	13.9
Moist specimen weight, gms.	159.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	130.9	139.7	
Dry density, pcf	118.7	122.6	
Void ratio	0.4200	0.3745	
Saturation, %	66.3	100.0	

Normal stress = 45.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 44.05 psi **at reading no.** 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	25.500	25.5	0.2	5.50	0.2992
2	0.0100	40.200	40.2	0.4	8.67	0.2989
3	0.0200	68.100	68.1	0.8	14.68	0.2975
4	0.0300	98.000	98.0	1.2	21.13	0.2970
5	0.0400	146.500	146.5	1.6	31.59	0.2969
6	0.0500	179.500	179.5	2.1	38.70	0.2978
7	0.0600	189.400	189.4	2.5	40.84	0.2989
8	0.0740	200.500	200.5	3.0	43.23	0.3007
9	0.0800	204.100	204.1	3.3	44.01	0.3019
10	0.0900	204.300	204.3	3.7	44.05	0.3032
11	0.1000	203.200	203.2	4.1	43.81	0.3041
12	0.1100	202.000	202.0	4.5	43.56	0.3053
13	0.1200	196.700	196.7	4.9	42.41	0.3067

Results

C, psi	1.08
ϕ, deg	42.8
Tan(ϕ)	0.93

Vertical Deformation, in. — Strain, %

Dilation / Consol.

Fail. Stress, psi — Normal Stress, psi

Shear Stress, psi — Strain, %
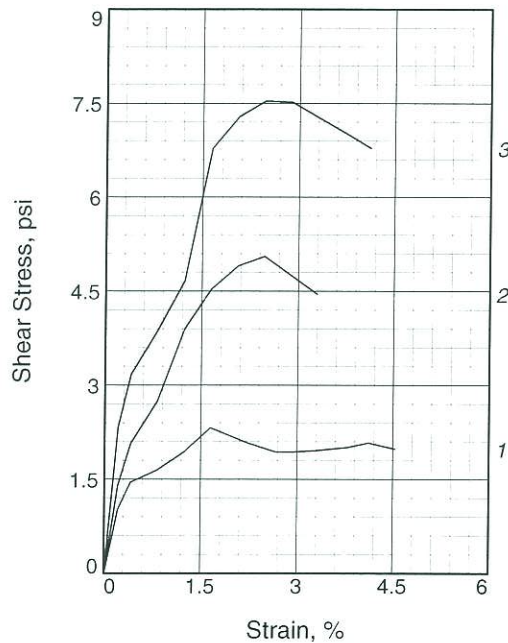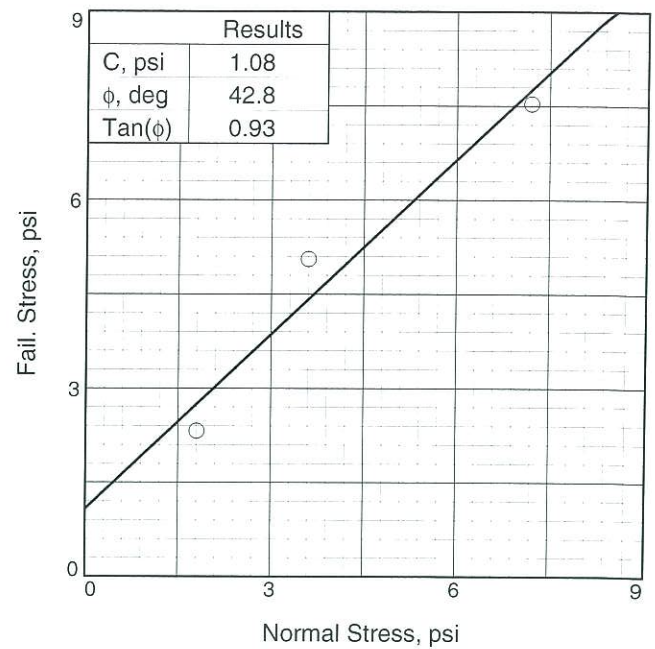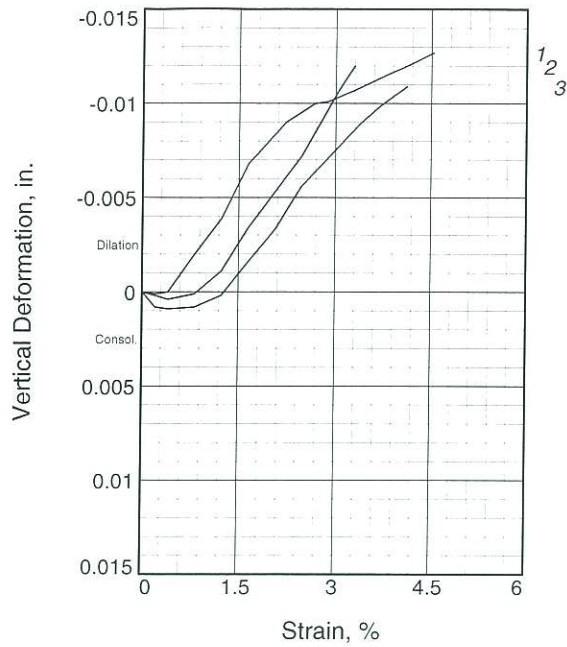
Sample No.		1	2	3
	Water Content, %	9.3	9.5	9.2
	Dry Density, pcf	108.8	108.6	108.9
Initial	Saturation, %	45.7	46.6	45.4
	Void Ratio	0.5486	0.5522	0.5475
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
	Water Content, %	20.2	20.1	19.5
	Dry Density, pcf	109.0	109.2	110.4
At Test	Saturation, %	99.9	99.9	99.9
	Void Ratio	0.5457	0.5430	0.5270
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
Normal Stress, psi		1.80	3.60	7.20
Fail. Stress, psi		2.32	5.06	7.54
Strain, %		1.6	2.5	2.5
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0004R, S04
Sample Number: S36240   **Depth:** 8-9.4
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:
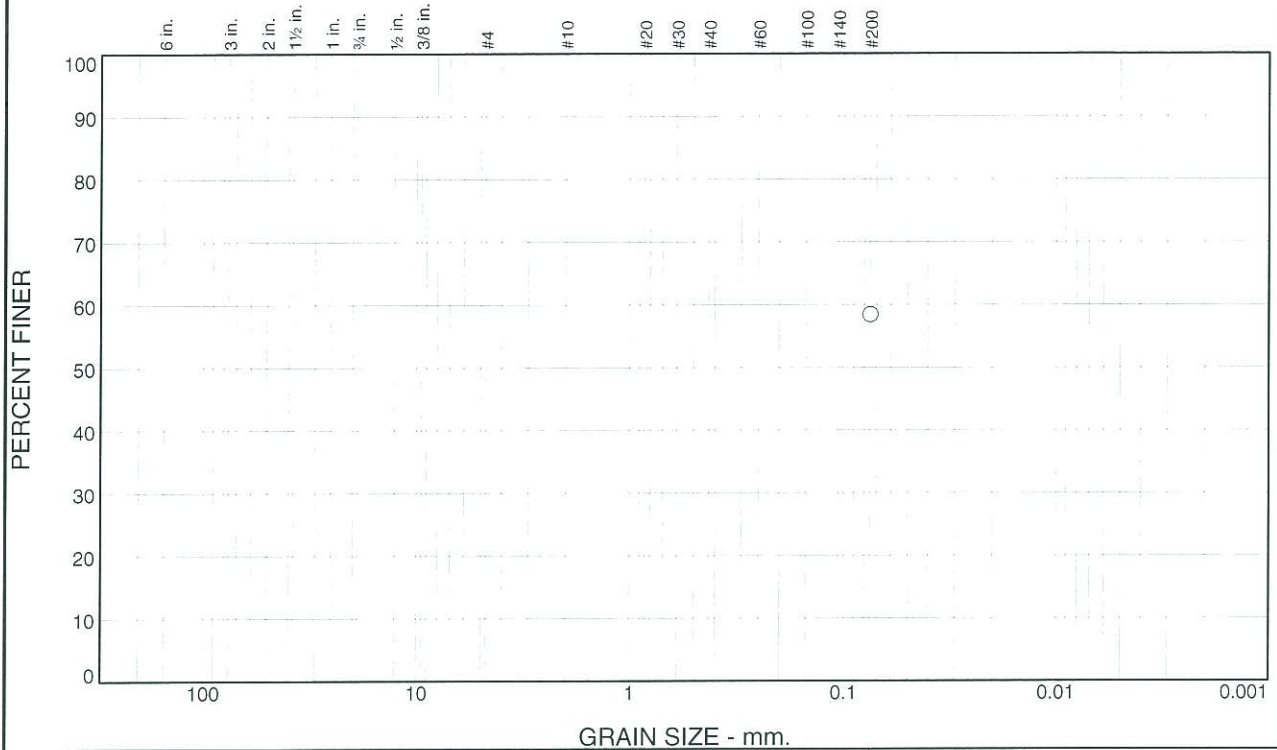**Client:**   URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0004R, S04
Depth: 8-9.4   **Sample Number:**   S36240
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2357.700		2372.150
Moisture content: Dry soil+tare, gms.	2345.400		2345.400
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	9.3	20.2	20.2
Moist specimen weight, gms.	144.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	118.9	131.1	
Dry density, pcf	108.8	109.0	
Void ratio	0.5486	0.5457	
Saturation, %	45.7	99.9	

Test Readings for Specimen No. 1

Load ring constant = 1.122 lbs. per input unit
Normal stress = 1.8 psi
Strain rate, in./min. = 0.03
Fail. Stress = 2.32 psi **at reading no.** 5

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.200	4.7	0.2	1.02	0.2999
2	0.0100	6.000	6.7	0.4	1.45	0.3000
3	0.0200	6.800	7.6	0.8	1.65	0.3020
4	0.0300	8.000	9.0	1.2	1.94	0.3039
5	0.0400	9.600	10.8	1.6	2.32	0.3068
6	0.0540	8.600	9.6	2.2	2.08	0.3090
7	0.0650	8.000	9.0	2.7	1.94	0.3100
8	0.0700	8.000	9.0	2.9	1.94	0.3101
9	0.0800	8.100	9.1	3.3	1.96	0.3107
10	0.0920	8.300	9.3	3.8	2.01	0.3115
11	0.1000	8.600	9.6	4.1	2.08	0.3120

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	8.200	9.2	4.5	1.98	0.3127

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2341.000		2354.950
Moisture content: Dry soil+tare, gms.	2328.400		2328.400
Moisture content: Tare, gms.	2196.200		2196.200
Moisture, %	9.5	20.1	20.1
Moist specimen weight, gms.	144.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	118.9	131.2	
Dry density, pcf	108.6	109.2	
Void ratio	0.5522	0.5430	
Saturation, %	46.6	99.9	

Load ring constant = .8988 lbs. per input unit

Normal stress = 3.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 5.06 psi at reading no. 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.200	6.5	0.2	1.40	0.2998
2	0.0100	10.700	9.6	0.4	2.07	0.2996
3	0.0200	14.200	12.8	0.8	2.75	0.2999
4	0.0300	20.100	18.1	1.2	3.90	0.3011
5	0.0400	23.400	21.0	1.6	4.53	0.3034
6	0.0500	25.300	22.7	2.1	4.90	0.3053
7	0.0600	26.100	23.5	2.5	5.06	0.3072
8	0.0740	23.900	21.5	3.0	4.63	0.3107
9	0.0800	23.000	20.7	3.3	4.46	0.3120

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Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2357.700		2371.350
Moisture content: Dry soil+tare, gms.	2345.500		2345.500
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	9.2	19.5	19.5
Moist specimen weight, gms.	144.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	118.9	131.9	
Dry density, pcf	108.9	110.4	
Void ratio	0.5475	0.5270	
Saturation, %	45.4	99.9	

Load ring constant = .8988 lbs. per input unit

Normal stress = 7.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 7.54 psi at reading no. 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	12.000	10.8	0.2	2.33	0.2992
2	0.0100	16.400	14.7	0.4	3.18	0.2991
3	0.0200	20.000	18.0	0.8	3.88	0.2992
4	0.0300	24.100	21.7	1.2	4.67	0.2998
5	0.0400	35.000	31.5	1.6	6.78	0.3016
6	0.0500	37.600	33.8	2.1	7.29	0.3033
7	0.0600	38.900	35.0	2.5	7.54	0.3056
8	0.0700	38.800	34.9	2.9	7.52	0.3071
9	0.0820	37.300	33.5	3.4	7.23	0.3089
10	0.0900	36.300	32.6	3.7	7.04	0.3099
11	0.1000	35.000	31.5	4.1	6.78	0.3109

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Results

C, psi	3.21
φ, deg	41.9
Tan(φ)	0.90
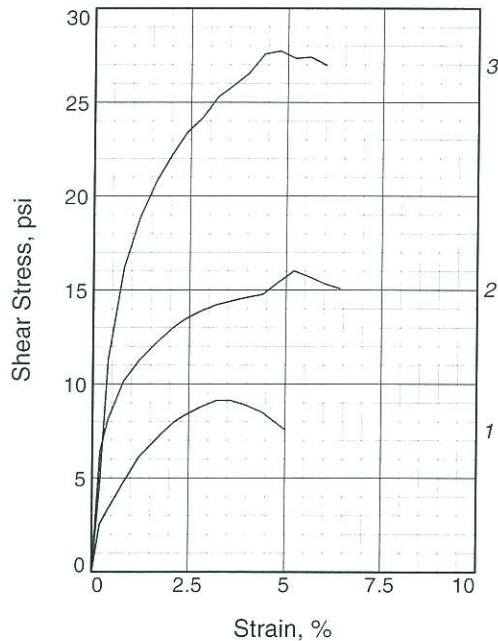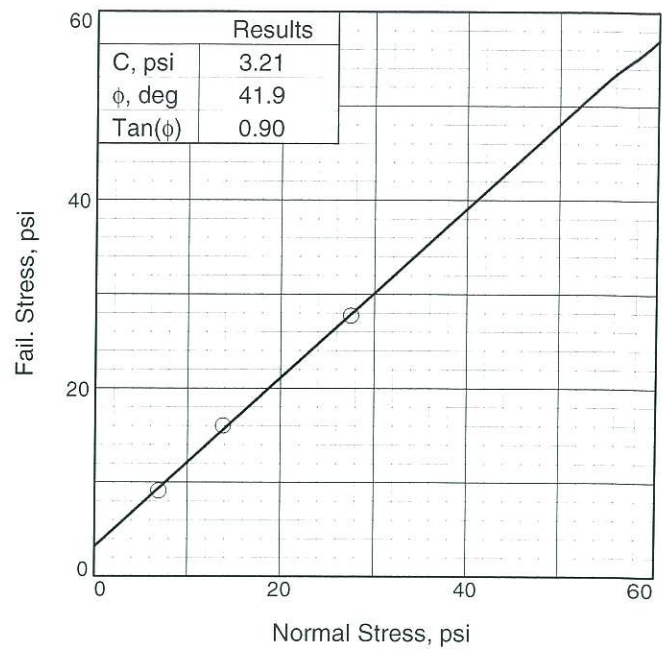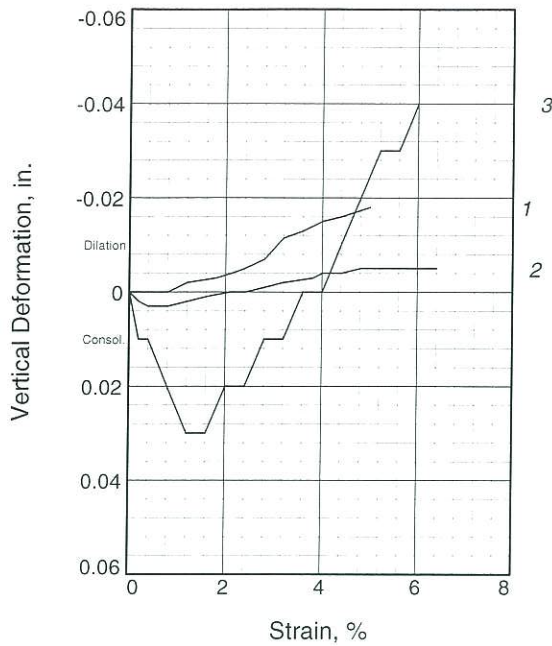
Sample No.		1	2	3
Initial	Water Content, %	16.1	16.1	16.2
	Dry Density, pcf	117.3	117.3	117.2
	Saturation, %	99.3	99.3	99.5
	Void Ratio	0.4374	0.4374	0.4383
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.5	18.2	18.8
	Dry Density, pcf	114.4	113.1	111.7
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.4733	0.4906	0.5088
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.02	1.04	1.05
Normal Stress, psi		6.90	13.80	27.50
Fail. Stress, psi		9.11	16.03	27.74
Strain, %		3.2	5.2	4.8
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
　Fresno to Bakersfield Geotech Investigation
Location: S0004R, S11
Sample Number: S36242　　**Depth:** 30-31.4
Proj. No.: 11-111　　　**Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw　　　　　**Checked By:** MPW

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0004R, S11
Depth: 30-31.4   **Sample Number:**   S36242
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3709.200		3711.400
Moisture content: Dry soil+tare, gms.	3684.900		3684.900
Moisture content: Tare, gms.	3533.800		3533.800
Moisture, %	16.1	17.5	17.5
Moist specimen weight, gms.	175.4		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.02	
Net decrease in height, in.		-0.03	
Wet density, pcf	136.1	134.5	
Dry density, pcf	117.3	114.4	
Void ratio	0.4374	0.4733	
Saturation, %	99.3	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.2422 lbs. per input unit
Normal stress = 6.9 psi
Strain rate, in./min. = 0.03
Fail. Stress = 9.11 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	10.000	12.4	0.2	2.53	0.0000
2	0.0100	13.000	16.1	0.4	3.29	0.0000
3	0.0200	18.700	23.2	0.8	4.73	0.0000
4	0.0300	24.100	29.9	1.2	6.10	0.0020
5	0.0450	29.200	36.3	1.8	7.39	0.0030
6	0.0530	31.600	39.3	2.1	8.00	0.0040
7	0.0600	33.000	41.0	2.4	8.35	0.0050
8	0.0700	34.700	43.1	2.8	8.78	0.0070
9	0.0800	36.000	44.7	3.2	9.11	0.0115
10	0.0900	36.000	44.7	3.6	9.11	0.0130
11	0.1000	35.000	43.5	4.0	8.86	0.0150

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	33.600	41.7	4.4	8.50	0.0160
13	0.1250	29.900	37.1	5.0	7.57	0.0180

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3470.800		3473.950
Moisture content: Dry soil+tare, gms.	3446.500		3446.500
Moisture content: Tare, gms.	3295.400		3295.400
Moisture, %	16.1	18.2	18.2
Moist specimen weight, gms.	175.4		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.04	
Net decrease in height, in.		-0.04	
Wet density, pcf	136.1	133.6	
Dry density, pcf	117.3	113.1	
Void ratio	0.4374	0.4906	
Saturation, %	99.3	100.0	

Normal stress = 13.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 16.03 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	31.500	31.5	0.2	6.42	-0.0020
2	0.0100	39.800	39.8	0.4	8.11	-0.0030
3	0.0200	49.800	49.8	0.8	10.15	-0.0030
4	0.0300	55.300	55.3	1.2	11.27	-0.0020
5	0.0400	59.500	59.5	1.6	12.12	-0.0010
6	0.0520	63.900	63.9	2.1	13.02	0.0000
7	0.0600	66.100	66.1	2.4	13.47	0.0000
8	0.0700	68.200	68.2	2.8	13.89	0.0010
9	0.0800	69.800	69.8	3.2	14.22	0.0020
10	0.0950	71.300	71.3	3.8	14.53	0.0030
11	0.1000	71.700	71.7	4.0	14.61	0.0040
12	0.1100	72.600	72.6	4.4	14.79	0.0040
13	0.1200	75.700	75.7	4.8	15.42	0.0050
14	0.1300	78.700	78.7	5.2	16.03	0.0050
15	0.1400	77.200	77.2	5.6	15.73	0.0050
16	0.1500	75.300	75.3	6.0	15.34	0.0050
17	0.1600	74.100	74.1	6.4	15.10	0.0050

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3470.800		3474.850
Moisture content: Dry soil+tare, gms.	3446.400		3446.400
Moisture content: Tare, gms.	3295.400		3295.400
Moisture, %	16.2	18.8	18.8
Moist specimen weight, gms.	175.4		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.05	
Net decrease in height, in.		-0.05	
Wet density, pcf	136.1	132.8	
Dry density, pcf	117.2	111.7	
Void ratio	0.4383	0.5088	
Saturation, %	99.5	100.0	

Load ring constant = .8053 lbs. per input unit

Normal stress = 27.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 27.74 psi at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	28.800	23.2	0.2	4.72	-0.0100
2	0.0100	69.000	55.6	0.4	11.32	-0.0100
3	0.0200	98.900	79.6	0.8	16.22	-0.0200
4	0.0300	115.000	92.6	1.2	18.87	-0.0300
5	0.0400	126.500	101.9	1.6	20.75	-0.0300
6	0.0500	135.000	108.7	2.0	22.15	-0.0200
7	0.0600	142.600	114.8	2.4	23.39	-0.0200
8	0.0700	147.500	118.8	2.8	24.20	-0.0100
9	0.0800	154.200	124.2	3.2	25.30	-0.0100
10	0.0900	158.000	127.2	3.6	25.92	0.0000
11	0.1000	161.900	130.4	4.0	26.56	0.0000
12	0.1100	168.100	135.4	4.4	27.58	0.0100
13	0.1200	169.100	136.2	4.8	27.74	0.0200
14	0.1300	166.700	134.2	5.2	27.35	0.0300
15	0.1400	167.100	134.6	5.6	27.41	0.0300
16	0.1500	164.500	132.5	6.0	26.99	0.0400

Results	
C, psi	7.24
φ, deg	41.2
Tan(φ)	0.88

Vertical Deformation, in. vs Strain, %

Fail. Stress, psi vs Normal Stress, psi

Shear Stress, psi vs Strain, %
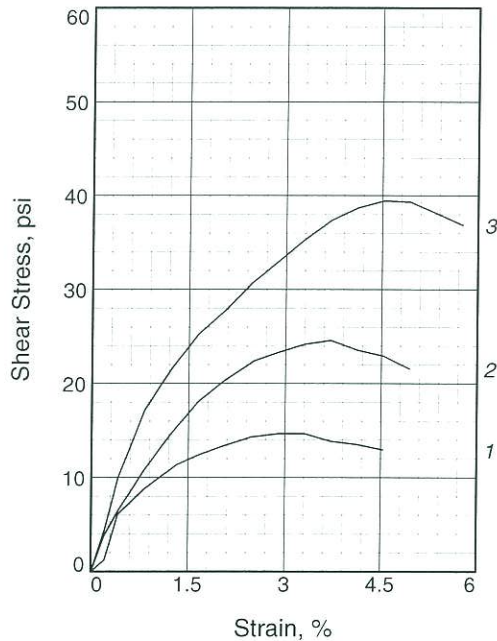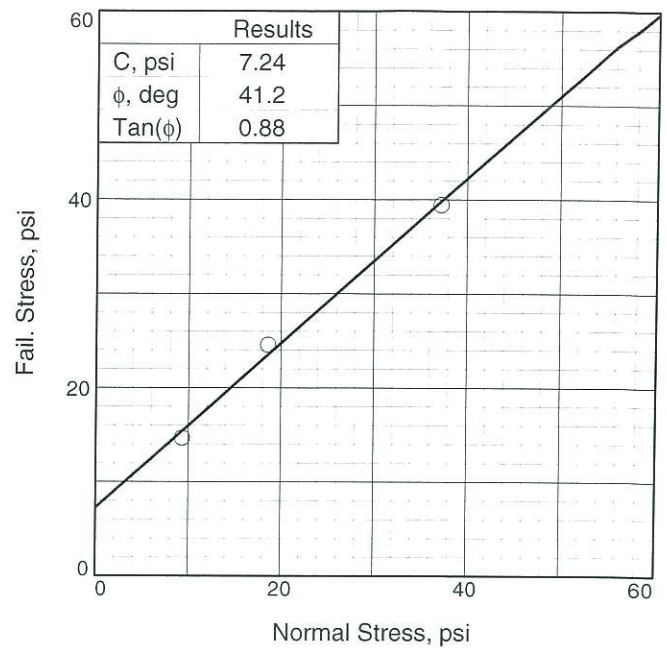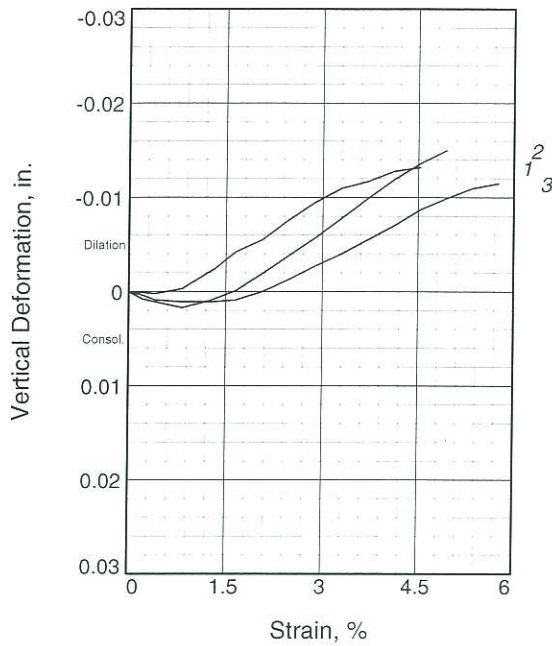
Sample No.		1	2	3
Initial	Water Content, %	14.9	14.9	15.0
	Dry Density, pcf	119.2	119.2	119.0
	Saturation, %	97.0	97.0	97.6
	Void Ratio	0.4142	0.4142	0.4161
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	14.3	14.2	13.6
	Dry Density, pcf	121.6	121.7	123.4
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.3862	0.3845	0.3663
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.98	0.96
Normal Stress, psi		9.30	18.60	37.20
Fail. Stress, psi		14.68	24.58	39.46
Strain, %		3.3	3.7	4.5
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
   Fresno to Bakersfield Geotech Investigation
Location: S0004R, S13
Sample Number: S36244   **Depth:** 40-41.0
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: js   **Checked By:** MPW

DIRECT SHEAR TEST

12/20/2011

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019
Project No.: 11-111
Location: S0004R, S13
Depth: 40-41.0   **Sample Number:** S36244
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2378.900		2378.050
Moisture content: Dry soil+tare, gms.	2357.300		2357.300
Moisture content: Tare, gms.	2212.200		2212.200
Moisture, %	14.9	14.3	14.3
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	136.9	139.0	
Dry density, pcf	119.2	121.6	
Void ratio	0.4142	0.3862	
Saturation, %	97.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.2822 lbs. per input unit
Normal stress = 9.3 psi
Strain rate, in./min. = 0.03
Fail. Stress = 14.68 psi at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.500	5.8	0.2	1.24	0.2999
2	0.0100	22.000	28.2	0.4	6.08	0.2998
3	0.0200	31.800	40.8	0.8	8.79	0.3003
4	0.0320	41.100	52.7	1.3	11.36	0.3024
5	0.0400	44.800	57.4	1.6	12.39	0.3042
6	0.0500	48.500	62.2	2.1	13.41	0.3055
7	0.0600	51.800	66.4	2.5	14.32	0.3076
8	0.0700	53.000	68.0	2.9	14.65	0.3095
9	0.0800	53.100	68.1	3.3	14.68	0.3110
10	0.0900	50.200	64.4	3.7	13.88	0.3117
11	0.1000	48.900	62.7	4.1	13.52	0.3128

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	46.800	60.0	4.5	12.94	0.3132

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.100		2362.150
Moisture content: Dry soil+tare, gms.	2341.500		2341.500
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	14.9	14.2	14.2
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	136.9	139.1	
Dry density, pcf	119.2	121.7	
Void ratio	0.4142	0.3845	
Saturation, %	97.0	99.9	

Normal stress = 18.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 24.58 psi at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	18.100	18.1	0.2	3.90	0.2992
2	0.0100	29.800	29.8	0.4	6.43	0.2989
3	0.0200	50.300	50.3	0.8	10.85	0.2983
4	0.0300	68.200	68.2	1.2	14.71	0.2990
5	0.0400	83.800	83.8	1.6	18.07	0.3001
6	0.0500	94.400	94.4	2.1	20.35	0.3019
7	0.0610	104.000	104.0	2.5	22.42	0.3040
8	0.0700	108.100	108.1	2.9	23.31	0.3057
9	0.0800	112.200	112.2	3.3	24.19	0.3078
10	0.0900	114.000	114.0	3.7	24.58	0.3099
11	0.1000	109.400	109.4	4.1	23.59	0.3119
12	0.1100	106.400	106.4	4.5	22.94	0.3136
13	0.1200	100.000	100.0	4.9	21.56	0.3150

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2378.900		2376.750
Moisture content: Dry soil+tare, gms.	2357.100		2357.100
Moisture content: Tare, gms.	2212.200		2212.200
Moisture, %	15.0	13.6	13.6
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	140.1	
Dry density, pcf	119.0	123.4	
Void ratio	0.4161	0.3663	
Saturation, %	97.6	100.0	

Normal stress = 37.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 39.46 psi **at reading no.** 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	20.500	20.5	0.2	4.42	0.2996
2	0.0100	46.000	46.0	0.4	9.92	0.2991
3	0.0200	79.600	79.6	0.8	17.16	0.2989
4	0.0300	100.000	100.0	1.2	21.56	0.2989
5	0.0400	117.000	117.0	1.6	25.23	0.2991
6	0.0500	128.700	128.7	2.1	27.75	0.3000
7	0.0600	142.300	142.3	2.5	30.68	0.3013
8	0.0700	153.000	153.0	2.9	32.99	0.3027
9	0.0800	164.000	164.0	3.3	35.36	0.3040
10	0.0900	173.500	173.5	3.7	37.41	0.3055
11	0.1000	179.500	179.5	4.1	38.70	0.3070
12	0.1100	183.000	183.0	4.5	39.46	0.3087
13	0.1200	182.400	182.4	4.9	39.33	0.3099
14	0.1300	176.800	176.8	5.3	38.12	0.3110
15	0.1400	171.100	171.1	5.8	36.89	0.3115

	Results	
C, psi	0.55	
φ, deg	36.5	
Tan(φ)	0.74	

Vertical Deformation, in. (y-axis) vs Strain, % (x-axis)

Fail. Stress, psi (y-axis) vs Normal Stress, psi (x-axis)

Shear Stress, psi (y-axis) vs Strain, % (x-axis)
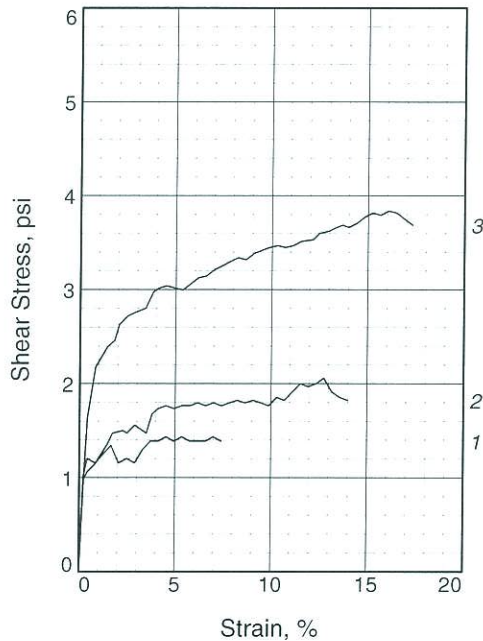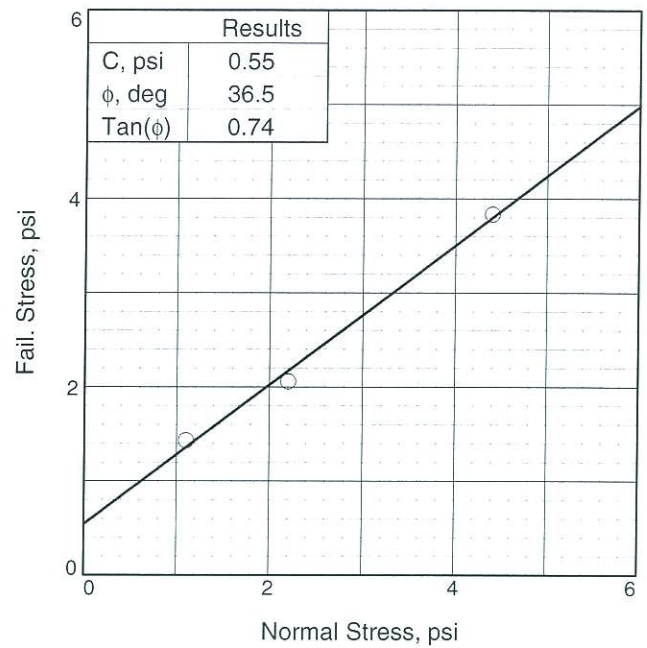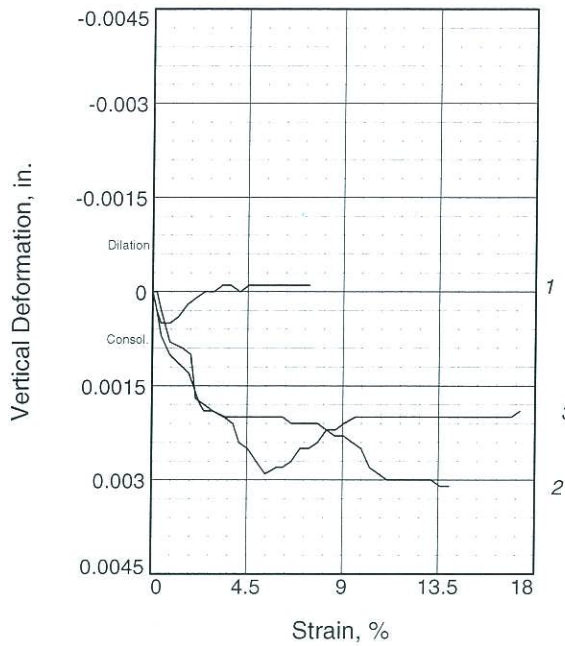
Sample No.		1	2	3
Initial	Water Content, %	5.3	5.0	5.0
	Dry Density, pcf	106.3	106.6	106.6
	Saturation, %	24.6	23.3	23.3
	Void Ratio	0.5857	0.5809	0.5809
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	21.6	21.2	20.9
	Dry Density, pcf	106.5	107.2	107.7
	Saturation, %	99.9	100.0	100.0
	Void Ratio	0.5829	0.5730	0.5647
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	0.99
Normal Stress, psi		1.10	2.20	4.40
Fail. Stress, psi		1.43	2.06	3.84
Strain, %		4.5	12.8	16.0
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0005R, S02
Sample Number: S36246   **Depth:** 5-6.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** MPW

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0005R, S02

Depth: 5-6.5   **Sample Number:**   S36246

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2349.200		2370.200
Moisture content: Dry soil+tare, gms.	2342.300		2342.300
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	5.3	21.6	21.6
Moist specimen weight, gms.	136.3		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	112.0	129.4	
Dry density, pcf	106.3	106.5	
Void ratio	0.5857	0.5829	
Saturation, %	24.6	99.9	

Test Readings for Specimen No. 1

Load ring constant = 2.1462 lbs. per input unit

Normal stress = 1.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.43 psi **at reading no.** 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	2.200	4.7	0.2	1.02	0.2997
2	0.0100	2.600	5.6	0.4	1.20	0.2995
3	0.0200	2.500	5.4	0.8	1.16	0.2995
4	0.0300	2.700	5.8	1.2	1.25	0.2996
5	0.0400	2.900	6.2	1.6	1.34	0.2998
6	0.0500	2.500	5.4	2.1	1.16	0.2999
7	0.0600	2.600	5.6	2.5	1.20	0.3000
8	0.0700	2.500	5.4	2.9	1.16	0.3000
9	0.0800	2.800	6.0	3.3	1.30	0.3001
10	0.0900	3.000	6.4	3.7	1.39	0.3001
11	0.1000	3.000	6.4	4.1	1.39	0.3000

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	3.100	6.7	4.5	1.43	0.3001
13	0.1200	3.000	6.4	4.9	1.39	0.3001
14	0.1300	3.100	6.7	5.3	1.43	0.3001
15	0.1400	3.000	6.4	5.8	1.39	0.3001
16	0.1500	3.000	6.4	6.2	1.39	0.3001
17	0.1600	3.000	6.4	6.6	1.39	0.3001
18	0.1700	3.100	6.7	7.0	1.43	0.3001
19	0.1800	3.000	6.4	7.4	1.39	0.3001

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2332.700		2353.750
Moisture content: Dry soil+tare, gms.	2326.200		2326.200
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	5.0	21.2	21.2
Moist specimen weight, gms.	136.3		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	112.0	129.9	
Dry density, pcf	106.6	107.2	
Void ratio	0.5809	0.5730	
Saturation, %	23.3	100.0	

Load ring constant = 1.3644 lbs. per input unit

Normal stress = 2.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.06 psi **at reading no.** 32

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	3.300	4.5	0.2	0.97	0.2997
2	0.0100	3.600	4.9	0.4	1.06	0.2993
3	0.0200	3.900	5.3	0.8	1.15	0.2990
4	0.0350	4.600	6.3	1.4	1.35	0.2988
5	0.0420	5.000	6.8	1.7	1.47	0.2987
6	0.0550	5.100	7.0	2.3	1.50	0.2982
7	0.0600	5.000	6.8	2.5	1.47	0.2981
8	0.0700	5.300	7.2	2.9	1.56	0.2981
9	0.0850	5.000	6.8	3.5	1.47	0.2980
10	0.0920	5.700	7.8	3.8	1.68	0.2980
11	0.1000	5.900	8.0	4.1	1.74	0.2980
12	0.1100	6.000	8.2	4.5	1.77	0.2980
13	0.1200	5.900	8.0	4.9	1.74	0.2980
14	0.1300	6.000	8.2	5.3	1.77	0.2980
15	0.1400	6.000	8.2	5.8	1.77	0.2980

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
16	0.1500	6.100	8.3	6.2	1.79	0.2980
17	0.1600	6.000	8.2	6.6	1.77	0.2979
18	0.1700	6.100	8.3	7.0	1.79	0.2979
19	0.1800	6.000	8.2	7.4	1.77	0.2979
20	0.1900	6.100	8.3	7.8	1.79	0.2979
21	0.2000	6.200	8.5	8.2	1.82	0.2978
22	0.2100	6.100	8.3	8.6	1.79	0.2977
23	0.2200	6.200	8.5	9.1	1.82	0.2977
24	0.2300	6.100	8.3	9.5	1.79	0.2976
25	0.2400	6.000	8.2	9.9	1.77	0.2975
26	0.2500	6.300	8.6	10.3	1.85	0.2972
27	0.2600	6.200	8.5	10.7	1.82	0.2971
28	0.2700	6.500	8.9	11.1	1.91	0.2970
29	0.2800	6.800	9.3	11.5	2.00	0.2970
30	0.2900	6.700	9.1	11.9	1.97	0.2970
31	0.3000	6.800	9.3	12.3	2.00	0.2970
32	0.3100	7.000	9.6	12.8	2.06	0.2970
33	0.3200	6.500	8.9	13.2	1.91	0.2970
34	0.3300	6.300	8.6	13.6	1.85	0.2969
35	0.3400	6.200	8.5	14.0	1.82	0.2969

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2332.700		2353.350
Moisture content: Dry soil+tare, gms.	2326.200		2326.200
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	5.0	20.9	20.9
Moist specimen weight, gms.	136.3		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	112.0	130.3	
Dry density, pcf	106.6	107.7	
Void ratio	0.5809	0.5647	
Saturation, %	23.3	100.0	

Load ring constant = 1.00 lbs. per input unit

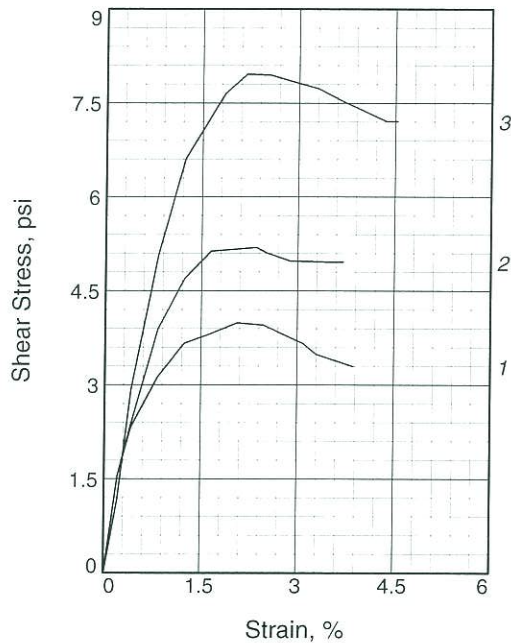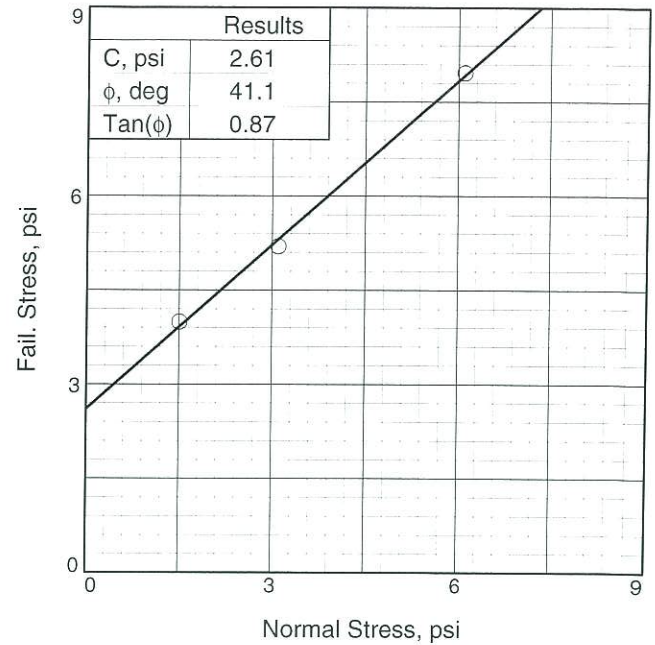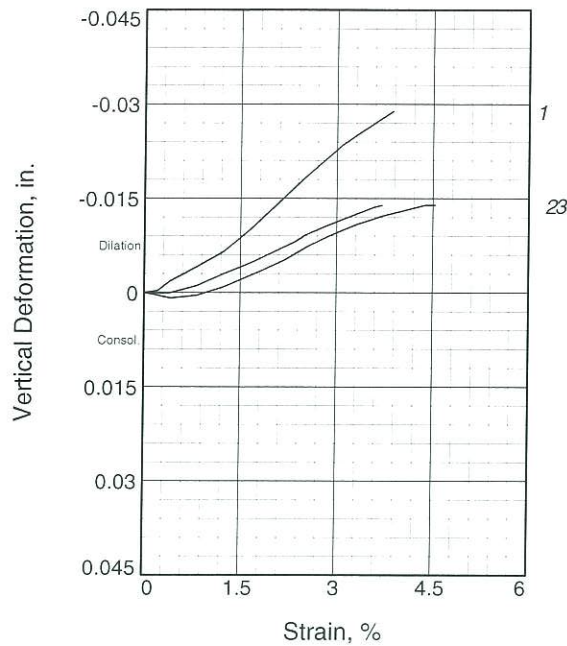Normal stress = 4.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.84 psi at reading no. 40

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.300	4.3	0.2	0.93	0.3000
2	0.0100	7.600	7.6	0.4	1.64	0.2997
3	0.0200	10.100	10.1	0.8	2.18	0.2992
4	0.0350	11.100	11.1	1.4	2.39	0.2991
5	0.0440	11.400	11.4	1.8	2.46	0.2990
6	0.0500	12.200	12.2	2.1	2.63	0.2983
7	0.0600	12.600	12.6	2.5	2.72	0.2982
8	0.0700	12.800	12.8	2.9	2.76	0.2981
9	0.0830	13.000	13.0	3.4	2.80	0.2980
10	0.0930	13.800	13.8	3.8	2.98	0.2979
11	0.1000	14.000	14.0	4.1	3.02	0.2976
12	0.1100	14.100	14.1	4.5	3.04	0.2975
13	0.1200	14.000	14.0	4.9	3.02	0.2973
14	0.1300	13.900	13.9	5.3	3.00	0.2971
15	0.1430	14.300	14.3	5.9	3.08	0.2972
16	0.1500	14.500	14.5	6.2	3.13	0.2972
17	0.1600	14.600	14.6	6.6	3.15	0.2973
18	0.1700	14.900	14.9	7.0	3.21	0.2975
19	0.1800	15.100	15.1	7.4	3.26	0.2975
20	0.1900	15.300	15.3	7.8	3.30	0.2976
21	0.2000	15.500	15.5	8.2	3.34	0.2978
22	0.2100	15.400	15.4	8.6	3.32	0.2978
23	0.2200	15.700	15.7	9.1	3.39	0.2979
24	0.2330	15.900	15.9	9.6	3.43	0.2980
25	0.2400	16.000	16.0	9.9	3.45	0.2980
26	0.2500	16.100	16.1	10.3	3.47	0.2980
27	0.2600	16.000	16.0	10.7	3.45	0.2980

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
28	0.2700	16.100	16.1	11.1	3.47	0.2980
29	0.2800	16.300	16.3	11.5	3.51	0.2980
30	0.2950	16.400	16.4	12.1	3.54	0.2980
31	0.3030	16.700	16.7	12.5	3.60	0.2980
32	0.3150	16.800	16.8	13.0	3.62	0.2980
33	0.3250	17.000	17.0	13.4	3.67	0.2980
34	0.3320	17.100	17.1	13.7	3.69	0.2980
35	0.3400	17.000	17.0	14.0	3.67	0.2980
36	0.3500	17.200	17.2	14.4	3.71	0.2980
37	0.3600	17.500	17.5	14.8	3.77	0.2980
38	0.3700	17.700	17.7	15.2	3.82	0.2980
39	0.3800	17.600	17.6	15.6	3.79	0.2980
40	0.3900	17.800	17.8	16.0	3.84	0.2980
41	0.4000	17.700	17.7	16.5	3.82	0.2980
42	0.4100	17.400	17.4	16.9	3.75	0.2980
43	0.4200	17.100	17.1	17.3	3.69	0.2981

	Results	
C, psi	0.21	
φ, deg	31.8	
Tan(φ)	0.62	
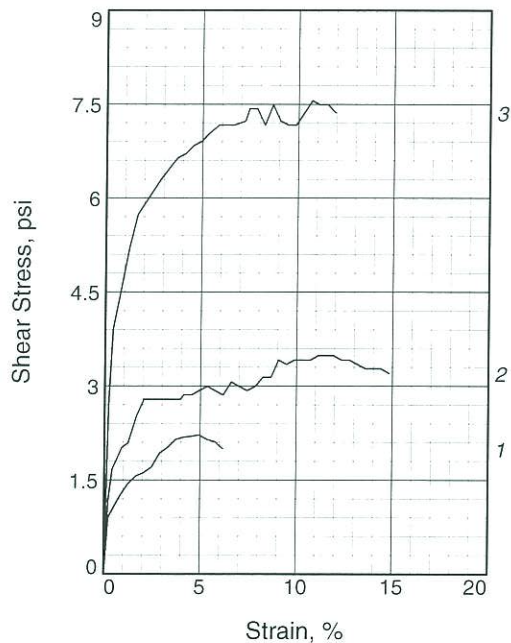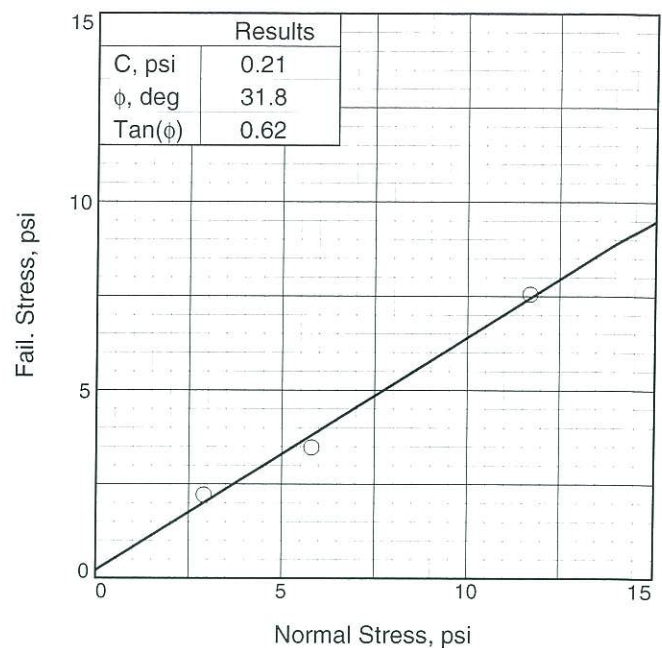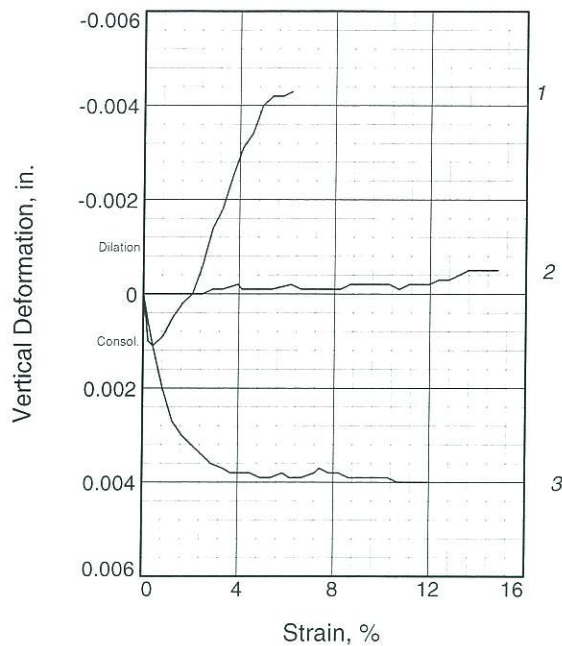
Sample No.		1	2	3
Initial	Water Content, %	13.1	13.5	13.3
	Dry Density, pcf	86.6	86.3	86.4
	Saturation, %	37.3	38.3	37.8
	Void Ratio	0.9468	0.9542	0.9505
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	33.9	24.6	22.4
	Dry Density, pcf	88.0	101.2	105.0
	Saturation, %	99.9	100.0	100.0
	Void Ratio	0.9153	0.6650	0.6055
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.85	0.82
Normal Stress, psi		2.90	5.80	11.70
Fail. Stress, psi		2.22	3.48	7.56
Strain, %		4.9	11.1	10.7
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0005R, S08

Sample Number: S36247   **Depth:** 14-14.5

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw/js   **Checked By:** MPW

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0005R, S08

Depth: 14-14.5   **Sample Number:**   S36247

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2331.700		2353.600
Moisture content: Dry soil+tare, gms.	2317.900		2317.900
Moisture content: Tare, gms.	2212.500		2212.500
Moisture, %	13.1	33.9	33.9
Moist specimen weight, gms.	119.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	97.9	117.8	
Dry density, pcf	86.6	88.0	
Void ratio	0.9468	0.9153	
Saturation, %	37.3	99.9	

Test Readings for Specimen No. 1

Load ring constant = .8435 lbs. per input unit

Normal stress = 2.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.22 psi **at reading no. 13**

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.000	4.2	0.2	0.91	0.2990
2	0.0100	5.600	4.7	0.4	1.02	0.2989
3	0.0200	6.900	5.8	0.8	1.25	0.2991
4	0.0300	7.900	6.7	1.2	1.44	0.2995
5	0.0400	8.600	7.3	1.6	1.56	0.2998
6	0.0500	8.900	7.5	2.1	1.62	0.3000
7	0.0600	9.400	7.9	2.5	1.71	0.3006
8	0.0700	10.600	8.9	2.9	1.93	0.3014
9	0.0800	11.100	9.4	3.3	2.02	0.3018
10	0.0900	11.800	10.0	3.7	2.15	0.3025
11	0.1000	12.000	10.1	4.1	2.18	0.3031

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	12.100	10.2	4.5	2.20	0.3034
13	0.1200	12.200	10.3	4.9	2.22	0.3040
14	0.1300	11.800	10.0	5.3	2.15	0.3042
15	0.1400	11.600	9.8	5.8	2.11	0.3042
16	0.1500	11.000	9.3	6.2	2.00	0.3043

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2315.700		2327.350
Moisture content: Dry soil+tare, gms.	2301.500		2301.500
Moisture content: Tare, gms.	2196.500		2196.500
Moisture, %	13.5	24.6	24.6
Moist specimen weight, gms.	119.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.85	
Net decrease in height, in.		0.15	
Wet density, pcf	97.9	126.2	
Dry density, pcf	86.3	101.2	
Void ratio	0.9542	0.6650	
Saturation, %	38.3	100.0	

Load ring constant = 3.232 lbs. per input unit

Normal stress = 5.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.48 psi at reading no. 27

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	1.700	5.5	0.2	1.18	0.3000
2	0.0100	2.400	7.8	0.4	1.67	0.3000
3	0.0220	2.900	9.4	0.9	2.02	0.3000
4	0.0300	3.000	9.7	1.2	2.09	0.3000
5	0.0400	3.600	11.6	1.6	2.51	0.3000
6	0.0500	4.000	12.9	2.1	2.79	0.3000
7	0.0600	4.000	12.9	2.5	2.79	0.3000
8	0.0700	4.000	12.9	2.9	2.79	0.3001
9	0.0800	4.000	12.9	3.3	2.79	0.3001
10	0.0960	4.000	12.9	4.0	2.79	0.3002
11	0.1000	4.100	13.3	4.1	2.86	0.3001
12	0.1100	4.100	13.3	4.5	2.86	0.3001
13	0.1200	4.200	13.6	4.9	2.93	0.3001
14	0.1300	4.300	13.9	5.3	3.00	0.3001
15	0.1500	4.100	13.3	6.2	2.86	0.3002
16	0.1600	4.400	14.2	6.6	3.07	0.3001
17	0.1700	4.300	13.9	7.0	3.00	0.3001
18	0.1800	4.200	13.6	7.4	2.93	0.3001

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
19	0.1900	4.300	13.9	7.8	3.00	0.3001
20	0.2000	4.500	14.5	8.2	3.14	0.3001
21	0.2100	4.500	14.5	8.6	3.14	0.3002
22	0.2200	4.900	15.8	9.1	3.41	0.3002
23	0.2300	4.800	15.5	9.5	3.35	0.3002
24	0.2400	4.900	15.8	9.9	3.41	0.3002
25	0.2500	4.900	15.8	10.3	3.41	0.3002
26	0.2600	4.900	15.8	10.7	3.41	0.3001
27	0.2700	5.000	16.2	11.1	3.48	0.3002
28	0.2800	5.000	16.2	11.5	3.48	0.3002
29	0.2900	5.000	16.2	11.9	3.48	0.3002
30	0.3000	4.900	15.8	12.3	3.41	0.3003
31	0.3100	4.900	15.8	12.8	3.41	0.3003
32	0.3200	4.800	15.5	13.2	3.35	0.3004
33	0.3300	4.700	15.2	13.6	3.28	0.3005
34	0.3400	4.700	15.2	14.0	3.28	0.3005
35	0.3500	4.700	15.2	14.4	3.28	0.3005
36	0.3600	4.600	14.9	14.8	3.21	0.3005

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2331.700		2341.300
Moisture content: Dry soil+tare, gms.	2317.700		2317.700
Moisture content: Tare, gms.	2212.500		2212.500
Moisture, %	13.3	22.4	22.4
Moist specimen weight, gms.	119.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.82	
Net decrease in height, in.		0.18	
Wet density, pcf	97.9	128.5	
Dry density, pcf	86.4	105.0	
Void ratio	0.9505	0.6055	
Saturation, %	37.8	100.0	

Load ring constant = 3.022 lbs. per input unit

Normal stress = 11.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 7.56 psi at reading no. 27

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.200	12.7	0.2	2.74	0.2994
2	0.0100	6.000	18.1	0.4	3.91	0.2989
3	0.0200	7.000	21.2	0.8	4.56	0.2980
4	0.0300	8.000	24.2	1.2	5.21	0.2973
5	0.0400	8.800	26.6	1.6	5.73	0.2970
6	0.0500	9.100	27.5	2.1	5.93	0.2968
7	0.0600	9.400	28.4	2.5	6.13	0.2966
8	0.0700	9.700	29.3	2.9	6.32	0.2964
9	0.0820	10.000	30.2	3.4	6.52	0.2963
10	0.0900	10.200	30.8	3.7	6.65	0.2962
11	0.1000	10.300	31.1	4.1	6.71	0.2962
12	0.1100	10.500	31.7	4.5	6.84	0.2962
13	0.1200	10.600	32.0	4.9	6.91	0.2961
14	0.1300	10.800	32.6	5.3	7.04	0.2961
15	0.1420	11.000	33.2	5.8	7.17	0.2962
16	0.1500	11.000	33.2	6.2	7.17	0.2961
17	0.1610	11.000	33.2	6.6	7.17	0.2961
18	0.1750	11.100	33.5	7.2	7.23	0.2962
19	0.1800	11.400	34.5	7.4	7.43	0.2963
20	0.1900	11.400	34.5	7.8	7.43	0.2962
21	0.2000	11.000	33.2	8.2	7.17	0.2962
22	0.2100	11.500	34.8	8.6	7.49	0.2961
23	0.2200	11.100	33.5	9.1	7.23	0.2961
24	0.2300	11.000	33.2	9.5	7.17	0.2961
25	0.2400	11.000	33.2	9.9	7.17	0.2961
26	0.2500	11.300	34.1	10.3	7.36	0.2961
27	0.2600	11.600	35.1	10.7	7.56	0.2960

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
28	0.2700	11.500	34.8	11.1	7.49	0.2960
29	0.2800	11.500	34.8	11.5	7.49	0.2960
30	0.2900	11.300	34.1	11.9	7.36	0.2960

Results	
C, psi	1.55
φ, deg	41.2
Tan(φ)	0.88
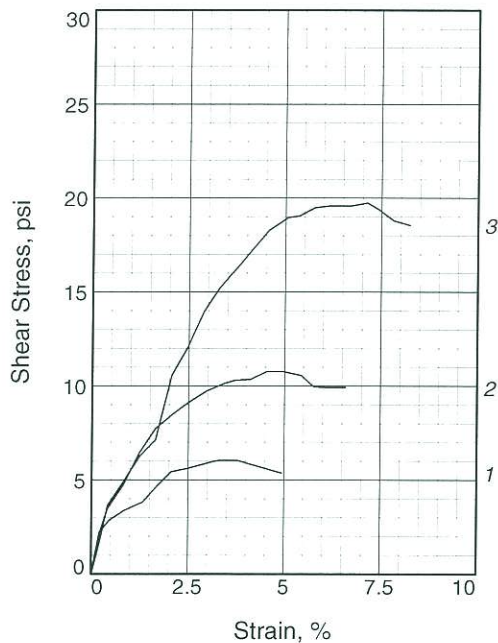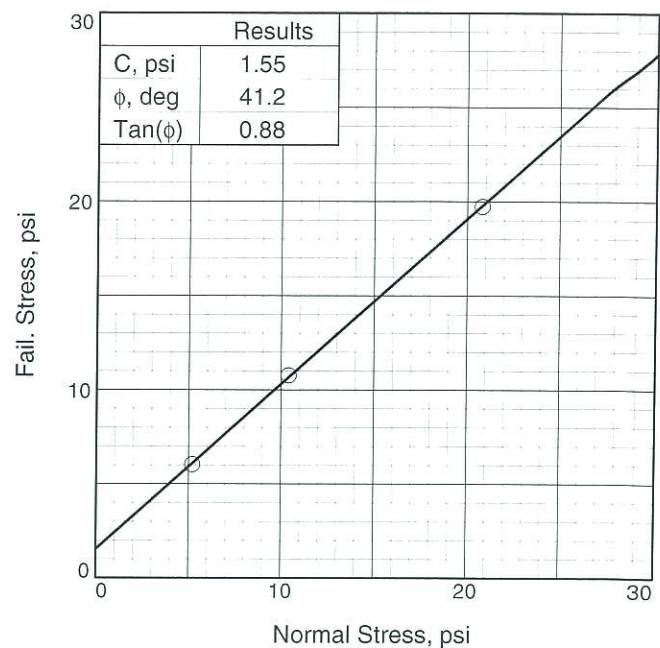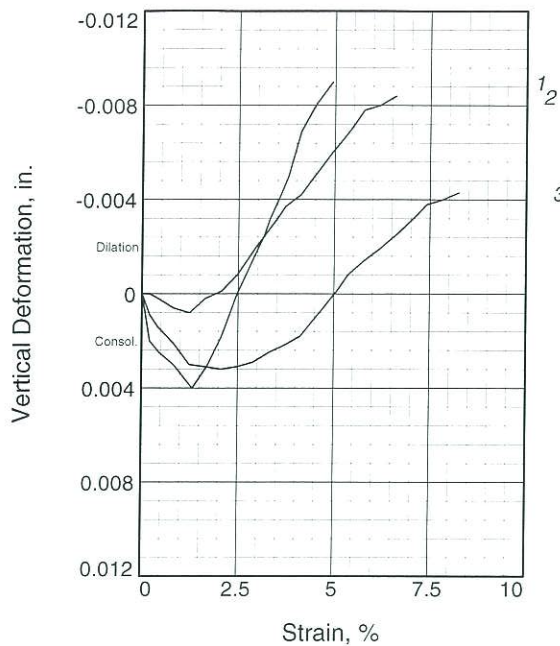
Sample No.		1	2	3
Initial	Water Content, %	18.5	18.8	18.5
	Dry Density, pcf	100.4	100.1	100.4
	Saturation, %	73.5	74.2	73.5
	Void Ratio	0.6792	0.6833	0.6792
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	24.0	24.2	23.2
	Dry Density, pcf	102.3	101.9	103.7
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.6473	0.6549	0.6261
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.98	0.97
Normal Stress, psi		5.20	10.40	20.80
Fail. Stress, psi		6.04	10.78	19.75
Strain, %		3.3	4.9	7.1
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0005R, S10
Sample Number: S36249   **Depth:** 25-25.8
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                         Fresno to Bakersfield Geotech Investigation
                         #SA-HST019
Project No.:   11-111
Location: S0005R, S10
Depth: 25-25.8   **Sample Number:**   S36249
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2357.200		2363.900
Moisture content: Dry soil+tare, gms.	2334.600		2334.600
Moisture content: Tare, gms.	2212.400		2212.400
Moisture, %	18.5	24.0	24.0
Moist specimen weight, gms.	144.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	118.9	126.9	
Dry density, pcf	100.4	102.3	
Void ratio	0.6792	0.6473	
Saturation, %	73.5	100.0	

Test Readings for Specimen No. 1

Normal stress = 5.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 6.04 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	10.300	10.3	0.2	2.22	0.2980
2	0.0110	13.200	13.2	0.5	2.85	0.2975
3	0.0200	15.600	15.6	0.8	3.36	0.2970
4	0.0320	17.700	17.7	1.3	3.82	0.2960
5	0.0410	21.700	21.7	1.7	4.68	0.2969
6	0.0500	25.200	25.2	2.1	5.43	0.2981
7	0.0600	26.000	26.0	2.5	5.61	0.3000
8	0.0770	27.800	27.8	3.2	5.99	0.3025
9	0.0800	28.000	28.0	3.3	6.04	0.3031
10	0.0920	28.000	28.0	3.8	6.04	0.3050
11	0.1000	27.100	27.1	4.1	5.84	0.3069
12	0.1100	26.000	26.0	4.5	5.61	0.3081

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	24.900	24.9	4.9	5.37	0.3090

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2341.500		2348.150
Moisture content: Dry soil+tare, gms.	2318.600		2318.600
Moisture content: Tare, gms.	2196.700		2196.700
Moisture, %	18.8	24.2	24.2
Moist specimen weight, gms.	144.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	118.9	126.5	
Dry density, pcf	100.1	101.9	
Void ratio	0.6833	0.6549	
Saturation, %	74.2	99.9	

Normal stress = 10.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 10.78 psi **at reading no.** 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	10.000	10.0	0.2	2.16	0.3000
2	0.0100	16.200	16.2	0.4	3.49	0.2998
3	0.0200	22.100	22.1	0.8	4.77	0.2994
4	0.0300	30.000	30.0	1.2	6.47	0.2992
5	0.0400	35.900	35.9	1.6	7.74	0.2998
6	0.0500	39.200	39.2	2.1	8.45	0.3001
7	0.0600	42.100	42.1	2.5	9.08	0.3008
8	0.0720	45.100	45.1	3.0	9.72	0.3020
9	0.0830	47.000	47.0	3.4	10.13	0.3030
10	0.0900	47.800	47.8	3.7	10.31	0.3037
11	0.1000	48.000	48.0	4.1	10.35	0.3042
12	0.1100	49.900	49.9	4.5	10.76	0.3051
13	0.1200	50.000	50.0	4.9	10.78	0.3060
14	0.1320	49.000	49.0	5.4	10.57	0.3070
15	0.1400	46.200	46.2	5.8	9.96	0.3078
16	0.1500	46.000	46.0	6.2	9.92	0.3080
17	0.1600	46.000	46.0	6.6	9.92	0.3084

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2357.200		2362.900
Moisture content: Dry soil+tare, gms.	2334.600		2334.600
Moisture content: Tare, gms.	2212.400		2212.400
Moisture, %	18.5	23.2	23.2
Moist specimen weight, gms.	144.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	118.9	127.7	
Dry density, pcf	100.4	103.7	
Void ratio	0.6792	0.6261	
Saturation, %	73.5	99.9	

Normal stress = 20.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 19.75 psi at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.800	7.8	0.2	1.68	0.2991
2	0.0100	16.900	16.9	0.4	3.64	0.2986
3	0.0200	22.800	22.8	0.8	4.92	0.2979
4	0.0300	29.000	29.0	1.2	6.25	0.2970
5	0.0400	33.100	33.1	1.6	7.14	0.2969
6	0.0500	49.000	49.0	2.1	10.57	0.2968
7	0.0600	55.900	55.9	2.5	12.05	0.2969
8	0.0700	64.800	64.8	2.9	13.97	0.2971
9	0.0800	70.700	70.7	3.3	15.24	0.2975
10	0.0920	76.100	76.1	3.8	16.41	0.2979
11	0.1000	79.800	79.8	4.1	17.21	0.2982
12	0.1110	84.800	84.8	4.6	18.28	0.2991
13	0.1230	88.000	88.0	5.1	18.97	0.3001
14	0.1300	88.400	88.4	5.3	19.06	0.3008
15	0.1400	90.400	90.4	5.8	19.49	0.3014
16	0.1500	90.900	90.9	6.2	19.60	0.3019
17	0.1620	90.800	90.8	6.7	19.58	0.3026
18	0.1730	91.600	91.6	7.1	19.75	0.3033
19	0.1800	90.000	90.0	7.4	19.41	0.3038
20	0.1900	87.200	87.2	7.8	18.80	0.3040
21	0.2000	86.100	86.1	8.2	18.57	0.3043

Vertical Deformation, in. vs **Strain, %**

-0.012	
-0.008	1
-0.004	
Dilation	
0	2
Consol.	3
0.004	
0.008	
0.012	

X-axis: Strain, % (0, 2.5, 5, 7.5, 10)

Fail. Stress, psi vs **Normal Stress, psi**

Results	
C, psi	2.25
φ, deg	39.1
Tan(φ)	0.81

Y-axis: 0, 20, 40, 60; X-axis: 0, 20, 40, 60

Shear Stress, psi vs **Strain, %**

Y-axis: 0, 10, 20, 30, 40, 50, 60; X-axis: 0, 2.5, 5, 7.5, 10 (curves labeled 1, 2, 3)
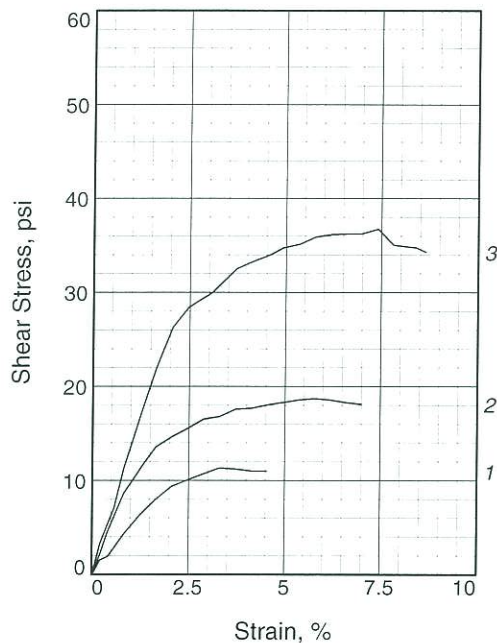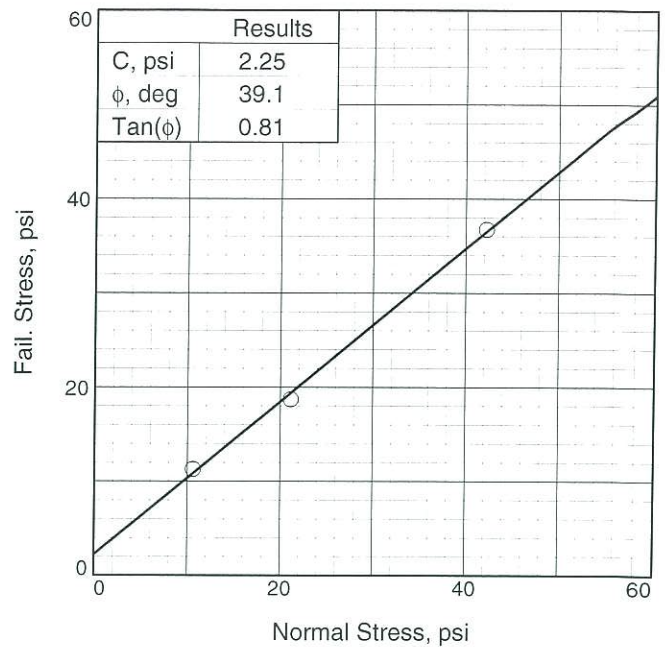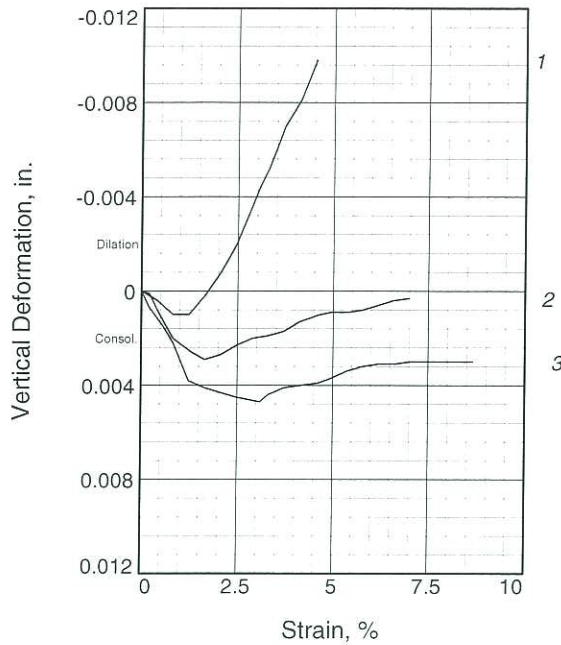
Sample No.		1	2	3
Initial	Water Content, %	19.3	19.5	19.3
	Dry Density, pcf	108.9	108.8	108.9
	Saturation, %	95.2	95.7	95.2
	Void Ratio	0.5475	0.5498	0.5475
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.9	17.7	17.9
	Dry Density, pcf	113.5	113.9	113.5
	Saturation, %	99.9	99.9	99.9
	Void Ratio	0.4853	0.4799	0.4853
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.96	0.95	0.96
Normal Stress, psi		10.60	21.10	42.20
Fail. Stress, psi		11.32	18.72	36.76
Strain, %		3.3	5.8	7.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	5.00

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0005R, S15
Sample Number: S36251   **Depth:** 46.5-47.5
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                      Fresno to Bakersfield Geotech Investigation
                      #SA-HST019
Project No.:   11-111
Location: S0005R, S15
Depth: 46.5-47.5   **Sample Number:**   S36251
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2354.600		2352.800
Moisture content: Dry soil+tare, gms.	2329.000		2329.000
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	19.3	17.9	17.9
Moist specimen weight, gms.	158.2		
Diameter, in.	2.43	2.43	
Area, in.^{2}	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	130.0	133.9	
Dry density, pcf	108.9	113.5	
Void ratio	0.5475	0.4853	
Saturation, %	95.2	99.9	

Test Readings for Specimen No. 1

Normal stress = 10.6 psi
Strain rate, in./min. = 0.03
Fail. Stress = 11.32 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.000	7.0	0.2	1.51	0.2998
2	0.0100	8.900	8.9	0.4	1.92	0.2996
3	0.0200	19.900	19.9	0.8	4.29	0.2990
4	0.0300	29.300	29.3	1.2	6.32	0.2990
5	0.0400	37.000	37.0	1.6	7.98	0.2998
6	0.0500	43.500	43.5	2.1	9.38	0.3008
7	0.0600	46.600	46.6	2.5	10.05	0.3020
8	0.0750	51.080	51.1	3.1	11.01	0.3045
9	0.0800	52.500	52.5	3.3	11.32	0.3052
10	0.0900	52.000	52.0	3.7	11.21	0.3070
11	0.1000	51.100	51.1	4.1	11.02	0.3081
12	0.1100	51.000	51.0	4.5	11.00	0.3098

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2371.100		2368.800
Moisture content: Dry soil+tare, gms.	2345.300		2345.300
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	19.5	17.7	17.7
Moist specimen weight, gms.	158.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	130.0	134.1	
Dry density, pcf	108.8	113.9	
Void ratio	0.5498	0.4799	
Saturation, %	95.7	99.9	

Normal stress = 21.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 18.72 psi at reading no. 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	9.800	9.8	0.2	2.11	0.2999
2	0.0100	21.500	21.5	0.4	4.64	0.2992
3	0.0200	40.100	40.1	0.8	8.65	0.2980
4	0.0320	54.200	54.2	1.3	11.69	0.2974
5	0.0400	62.900	62.9	1.6	13.56	0.2971
6	0.0500	67.900	67.9	2.1	14.64	0.2973
7	0.0600	72.140	72.1	2.5	15.56	0.2977
8	0.0700	76.600	76.6	2.9	16.52	0.2980
9	0.0800	77.900	77.9	3.3	16.80	0.2981
10	0.0900	81.500	81.5	3.7	17.57	0.2983
11	0.1000	82.100	82.1	4.1	17.70	0.2987
12	0.1130	84.000	84.0	4.7	18.11	0.2990
13	0.1200	84.800	84.8	4.9	18.28	0.2991
14	0.1300	86.100	86.1	5.3	18.57	0.2991
15	0.1400	86.800	86.8	5.8	18.72	0.2992
16	0.1500	86.200	86.2	6.2	18.59	0.2994
17	0.1600	84.900	84.9	6.6	18.31	0.2996
18	0.1700	84.100	84.1	7.0	18.13	0.2997

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2354.600		2352.800
Moisture content: Dry soil+tare, gms.	2329.000		2329.000
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	19.3	17.9	17.9
Moist specimen weight, gms.	158.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	130.0	133.9	
Dry density, pcf	108.9	113.5	
Void ratio	0.5475	0.4853	
Saturation, %	95.2	99.9	

Normal stress = 42.2 psi

Strain rate, in./min. = 5.00

Fail. Stress = 36.76 psi at reading no. 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	15.000	15.0	0.2	3.23	0.2993
2	0.0140	33.000	33.0	0.6	7.12	0.2985
3	0.0200	52.500	52.5	0.8	11.32	0.2978
4	0.0300	77.600	77.6	1.2	16.73	0.2962
5	0.0400	101.700	101.7	1.6	21.93	0.2959
6	0.0500	121.800	121.8	2.1	26.26	0.2957
7	0.0600	131.700	131.7	2.5	28.40	0.2955
8	0.0750	139.100	139.1	3.1	29.99	0.2953
9	0.0800	143.100	143.1	3.3	30.86	0.2956
10	0.0900	150.900	150.9	3.7	32.54	0.2959
11	0.1000	154.400	154.4	4.1	33.29	0.2960
12	0.1120	158.000	158.0	4.6	34.07	0.2961
13	0.1200	161.200	161.2	4.9	34.76	0.2963
14	0.1300	163.000	163.0	5.3	35.15	0.2966
15	0.1400	166.400	166.4	5.8	35.88	0.2968
16	0.1500	167.700	167.7	6.2	36.16	0.2969
17	0.1600	168.000	168.0	6.6	36.22	0.2969
18	0.1700	168.200	168.2	7.0	36.27	0.2970
19	0.1800	170.500	170.5	7.4	36.76	0.2970
20	0.1900	162.500	162.5	7.8	35.04	0.2970
21	0.2040	161.200	161.2	8.4	34.76	0.2970
22	0.2100	159.040	159.0	8.6	34.29	0.2970

Results	
C, psi	10.59
φ, deg	36.9
Tan(φ)	0.75
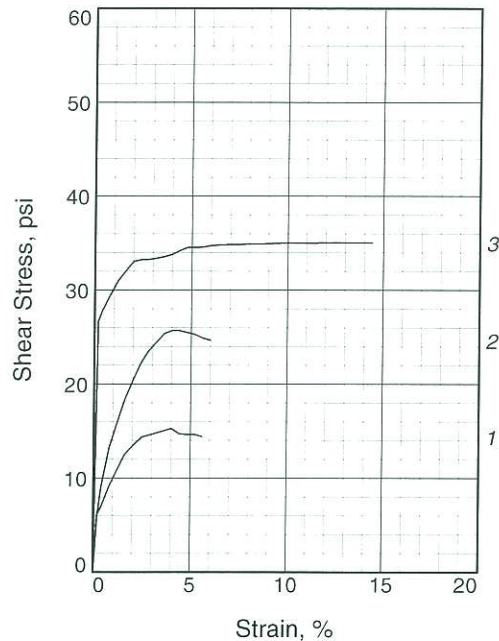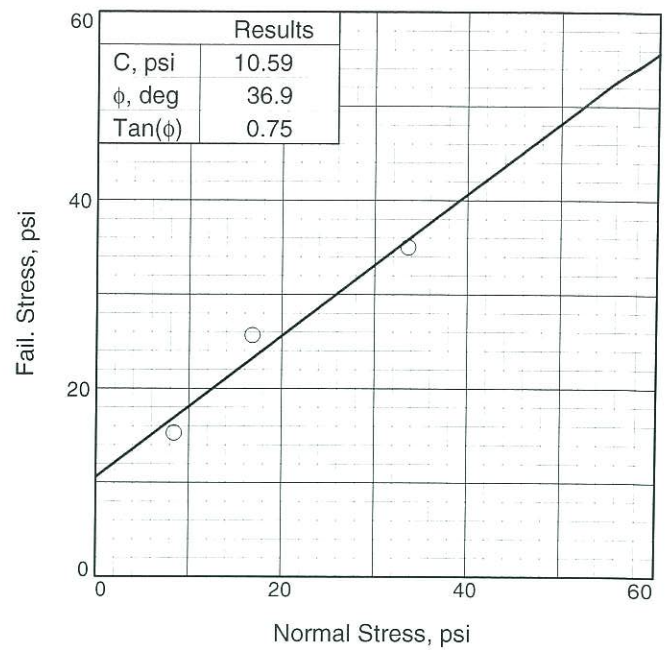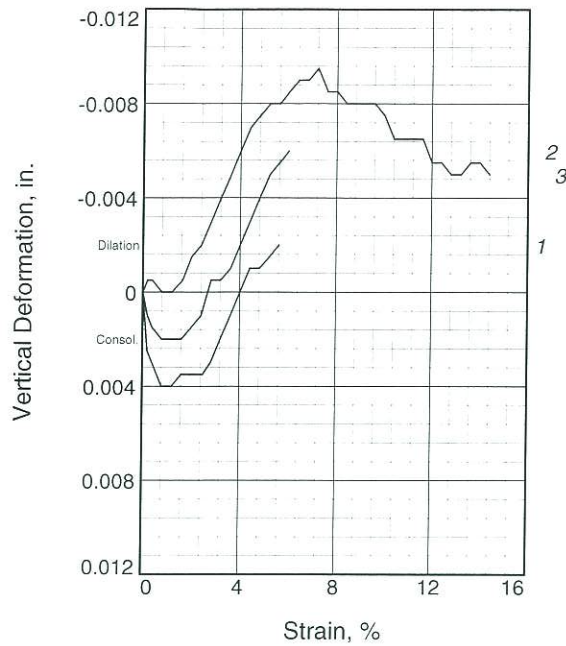
Sample No.		1	2	3
Initial	Water Content, %	11.9	12.1	12.1
	Dry Density, pcf	122.4	122.2	122.2
	Saturation, %	84.9	85.8	85.8
	Void Ratio	0.3772	0.3798	0.3798
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.8	13.9	13.9
	Dry Density, pcf	122.9	122.7	122.7
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.3716	0.3742	0.3741
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
Normal Stress, psi		8.40	16.80	33.60
Fail. Stress, psi		15.28	25.67	35.04
Strain, %		4.0	4.0	10.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0006R, S14

Sample Number: S36254   **Depth:** 38-39.4

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw/js   **Checked By:** MPW

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
                   Fresno to Bakersfield Geotech Investigation
                   #SA-HST019

Project No.:   11-111

Location: S0006R, S14

Depth: 38-39.4   **Sample Number:**   S36254

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3710.200		3713.200
Moisture content: Dry soil+tare, gms.	3691.500		3691.500
Moisture content: Tare, gms.	3533.800		3533.800
Moisture, %	11.9	13.8	13.8
Moist specimen weight, gms.	176.4		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	139.8	
Dry density, pcf	122.4	122.9	
Void ratio	0.3772	0.3716	
Saturation, %	84.9	100.0	

Test Readings for Specimen No. 1

Normal stress = 8.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 15.28 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	30.400	30.4	0.2	6.19	-0.0025
2	0.0100	34.100	34.1	0.4	6.95	-0.0030
3	0.0200	44.700	44.7	0.8	9.11	-0.0040
4	0.0300	53.200	53.2	1.2	10.84	-0.0040
5	0.0400	61.500	61.5	1.6	12.53	-0.0035
6	0.0500	65.900	65.9	2.0	13.43	-0.0035
7	0.0620	70.600	70.6	2.5	14.38	-0.0035
8	0.0700	71.400	71.4	2.8	14.55	-0.0030
9	0.0800	72.600	72.6	3.2	14.79	-0.0020
10	0.0900	73.800	73.8	3.6	15.03	-0.0010
11	0.1000	75.000	75.0	4.0	15.28	0.0000
12	0.1100	72.200	72.2	4.4	14.71	0.0010

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	71.800	71.8	4.8	14.63	0.0010
14	0.1300	71.900	71.9	5.2	14.65	0.0015
15	0.1400	70.800	70.8	5.6	14.42	0.0020

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3710.200		3713.000
Moisture content: Dry soil+tare, gms.	3691.200		3691.200
Moisture content: Tare, gms.	3533.800		3533.800
Moisture, %	12.1	13.9	13.9
Moist specimen weight, gms.	176.4		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	139.6	
Dry density, pcf	122.2	122.7	
Void ratio	0.3798	0.3742	
Saturation, %	85.8	99.9	

Normal stress = 16.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 25.67 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	29.000	29.0	0.2	5.91	-0.0010
2	0.0100	44.500	44.5	0.4	9.07	-0.0015
3	0.0200	65.000	65.0	0.8	13.24	-0.0020
4	0.0300	78.000	78.0	1.2	15.89	-0.0020
5	0.0400	90.400	90.4	1.6	18.42	-0.0020
6	0.0500	100.000	100.0	2.0	20.37	-0.0015
7	0.0600	109.100	109.1	2.4	22.23	-0.0010
8	0.0700	115.600	115.6	2.8	23.55	0.0005
9	0.0800	120.000	120.0	3.2	24.45	0.0005
10	0.0900	124.500	124.5	3.6	25.36	0.0010
11	0.1000	126.000	126.0	4.0	25.67	0.0020
12	0.1100	126.000	126.0	4.4	25.67	0.0030
13	0.1200	125.000	125.0	4.8	25.46	0.0040
14	0.1300	124.000	124.0	5.2	25.26	0.0050
15	0.1400	122.300	122.3	5.6	24.91	0.0055
16	0.1500	121.000	121.0	6.0	24.65	0.0060

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3450.700		3453.500
Moisture content: Dry soil+tare, gms.	3431.700		3431.700
Moisture content: Tare, gms.	3274.300		3274.300
Moisture, %	12.1	13.9	13.9
Moist specimen weight, gms.	176.4		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	139.7	
Dry density, pcf	122.2	122.7	
Void ratio	0.3798	0.3741	
Saturation, %	85.8	100.0	

Normal stress = 33.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 35.04 psi at reading no. 27

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0050	131.000	131.0	0.2	26.69	0.0005
2	0.0100	136.500	136.5	0.4	27.81	0.0005
3	0.0200	144.600	144.6	0.8	29.46	0.0000
4	0.0300	152.200	152.2	1.2	31.01	0.0000
5	0.0410	157.900	157.9	1.6	32.17	0.0005
6	0.0500	162.400	162.4	2.0	33.08	0.0015
7	0.0600	163.100	163.1	2.4	33.23	0.0020
8	0.0700	163.400	163.4	2.8	33.29	0.0030
9	0.0800	164.000	164.0	3.2	33.41	0.0040
10	0.0900	164.900	164.9	3.6	33.59	0.0050
11	0.1000	166.000	166.0	4.0	33.82	0.0060
12	0.1100	168.100	168.1	4.4	34.25	0.0070
13	0.1200	169.700	169.7	4.8	34.57	0.0075
14	0.1300	169.500	169.5	5.2	34.53	0.0080
15	0.1400	169.900	169.9	5.6	34.61	0.0080
16	0.1500	170.500	170.5	6.0	34.73	0.0085
17	0.1600	170.900	170.9	6.4	34.82	0.0090
18	0.1700	171.000	171.0	6.8	34.84	0.0090
19	0.1800	171.100	171.1	7.2	34.86	0.0095
20	0.1900	171.200	171.2	7.6	34.88	0.0085
21	0.2000	171.500	171.5	8.0	34.94	0.0085
22	0.2100	171.400	171.4	8.4	34.92	0.0080
23	0.2200	171.500	171.5	8.8	34.94	0.0080
24	0.2300	171.700	171.7	9.2	34.98	0.0080
25	0.2400	171.800	171.8	9.6	35.00	0.0080
26	0.2500	171.900	171.9	10.0	35.02	0.0075
27	0.2600	172.000	172.0	10.4	35.04	0.0065
28	0.2700	171.900	171.9	10.8	35.02	0.0065

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
29	0.2800	171.900	171.9	11.2	35.02	0.0065
30	0.2900	172.000	172.0	11.6	35.04	0.0065
31	0.3000	172.000	172.0	12.0	35.04	0.0055
32	0.3100	172.000	172.0	12.4	35.04	0.0055
33	0.3200	172.000	172.0	12.8	35.04	0.0050
34	0.3300	172.000	172.0	13.2	35.04	0.0050
35	0.3400	172.000	172.0	13.6	35.04	0.0055
36	0.3500	172.000	172.0	14.0	35.04	0.0055
37	0.3600	172.000	172.0	14.4	35.04	0.0050

Results	
C, psi	1.30
φ, deg	40.6
Tan(φ)	0.86
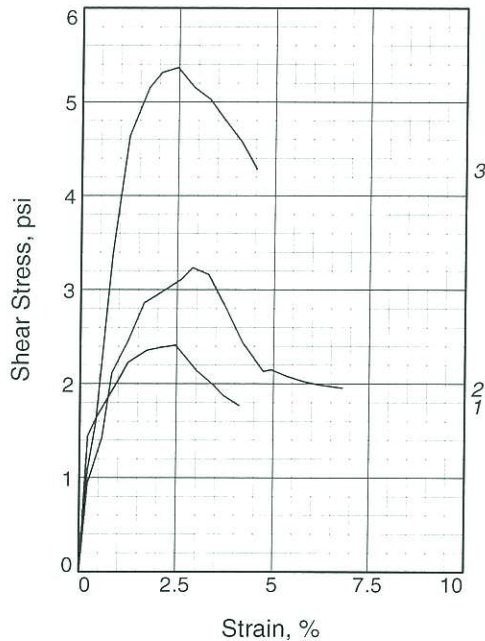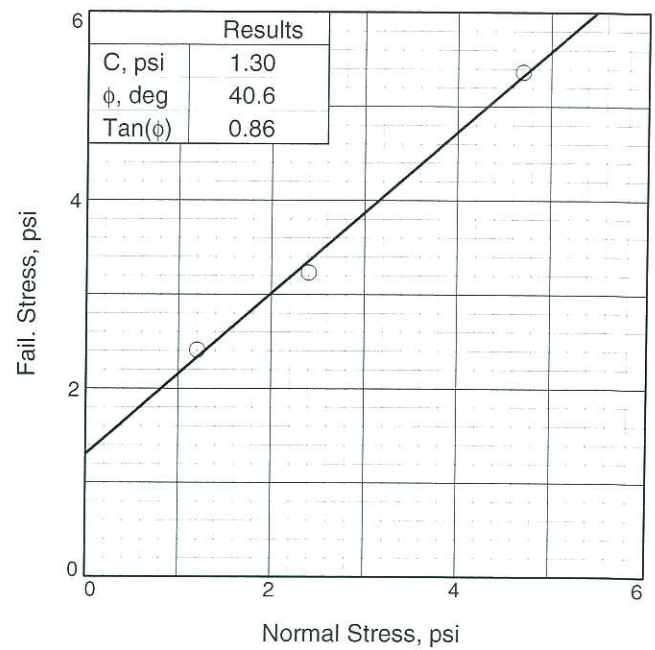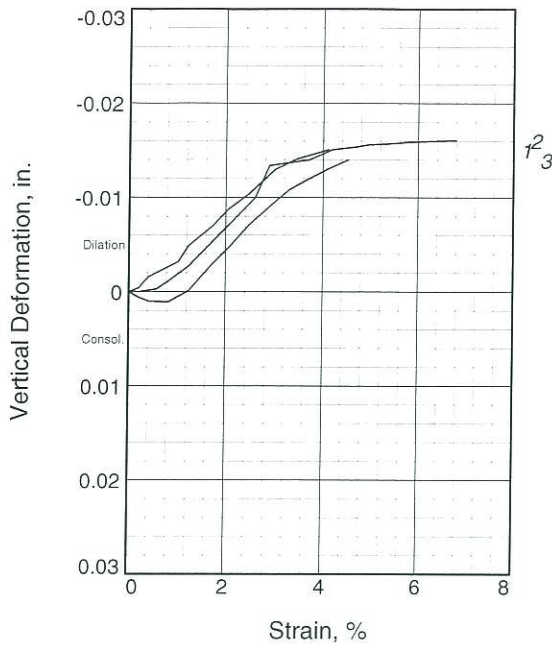
Sample No.		1	2	3
Initial	Water Content, %	13.2	13.3	13.0
	Dry Density, pcf	120.9	120.8	121.2
	Saturation, %	90.8	91.1	89.9
	Void Ratio	0.3940	0.3949	0.3912
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	14.4	14.2	14.1
	Dry Density, pcf	121.4	121.8	122.0
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.3887	0.3834	0.3816
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
Normal Stress, psi		1.20	2.40	4.70
Fail. Stress, psi		2.41	3.23	5.37
Strain, %		2.5	2.9	2.5
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0007R, S04
Sample Number: S36257   **Depth:** 5-6.3
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
                   Fresno to Bakersfield Geotech Investigation
                   #SA-HST019

Project No.:   11-111

Location: S0007R, S04

Depth: 5-6.3   **Sample Number:**   S36257

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2378.900		2380.600
Moisture content: Dry soil+tare, gms.	2359.400		2359.400
Moisture content: Tare, gms.	2212.200		2212.200
Moisture, %	13.2	14.4	14.4
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	138.9	
Dry density, pcf	120.9	121.4	
Void ratio	0.3940	0.3887	
Saturation, %	90.8	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.2422 lbs. per input unit

Normal stress = 1.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.41 psi **at reading no.** 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.400	6.7	0.2	1.45	0.3004
2	0.0100	6.100	7.6	0.4	1.63	0.3016
3	0.0250	7.700	9.6	1.0	2.06	0.3032
4	0.0300	8.300	10.3	1.2	2.22	0.3049
5	0.0420	8.800	10.9	1.7	2.36	0.3070
6	0.0500	8.900	11.1	2.1	2.38	0.3088
7	0.0600	9.000	11.2	2.5	2.41	0.3104
8	0.0730	8.000	9.9	3.0	2.14	0.3130
9	0.0840	7.400	9.2	3.5	1.98	0.3141
10	0.0900	7.000	8.7	3.7	1.87	0.3145
11	0.1000	6.600	8.2	4.1	1.77	0.3151

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Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.000		2364.270
Moisture content: Dry soil+tare, gms.	2343.400		2343.400
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	13.3	14.2	14.2
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	136.9	139.1	
Dry density, pcf	120.8	121.8	
Void ratio	0.3949	0.3834	
Saturation, %	91.1	99.9	

Load ring constant = .8242 lbs. per input unit

Normal stress = 2.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.23 psi at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.300	4.4	0.2	0.94	0.3000
2	0.0140	8.000	6.6	0.6	1.42	0.3003
3	0.0200	11.900	9.8	0.8	2.11	0.3011
4	0.0300	13.800	11.4	1.2	2.45	0.3027
5	0.0400	16.100	13.3	1.6	2.86	0.3049
6	0.0500	16.700	13.8	2.1	2.97	0.3071
7	0.0630	17.500	14.4	2.6	3.11	0.3100
8	0.0700	18.200	15.0	2.9	3.23	0.3134
9	0.0800	17.800	14.7	3.3	3.16	0.3137
10	0.0900	16.000	13.2	3.7	2.84	0.3140
11	0.1020	13.700	11.3	4.2	2.43	0.3151
12	0.1150	12.000	9.9	4.7	2.13	0.3154
13	0.1200	12.100	10.0	4.9	2.15	0.3156
14	0.1300	11.700	9.6	5.3	2.08	0.3157
15	0.1400	11.400	9.4	5.8	2.03	0.3159
16	0.1500	11.200	9.2	6.2	1.99	0.3160
17	0.1650	11.000	9.1	6.8	1.95	0.3161

Sierra Testing Labs, Inc.

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2364.200		2365.850
Moisture content: Dry soil+tare, gms.	2345.000		2345.000
Moisture content: Tare, gms.	2197.500		2197.500
Moisture, %	13.0	14.1	14.1
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	136.9	139.3	
Dry density, pcf	121.2	122.0	
Void ratio	0.3912	0.3816	
Saturation, %	89.9	100.0	

Load ring constant = .8242 lbs. per input unit

Normal stress = 4.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 5.37 psi at reading no. 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	6.100	5.0	0.2	1.08	0.2994
2	0.0100	9.000	7.4	0.4	1.60	0.2990
3	0.0200	19.000	15.7	0.8	3.38	0.2989
4	0.0300	26.100	21.5	1.2	4.64	0.3001
5	0.0420	29.000	23.9	1.7	5.15	0.3030
6	0.0500	29.900	24.6	2.1	5.31	0.3047
7	0.0600	30.200	24.9	2.5	5.37	0.3071
8	0.0700	29.000	23.9	2.9	5.15	0.3090
9	0.0800	28.300	23.3	3.3	5.03	0.3108
10	0.0900	27.000	22.3	3.7	4.80	0.3120
11	0.1000	25.800	21.3	4.1	4.59	0.3131
12	0.1100	24.100	19.9	4.5	4.28	0.3140

Results	
C, psi	3.28
ϕ, deg	35.7
Tan(ϕ)	0.72
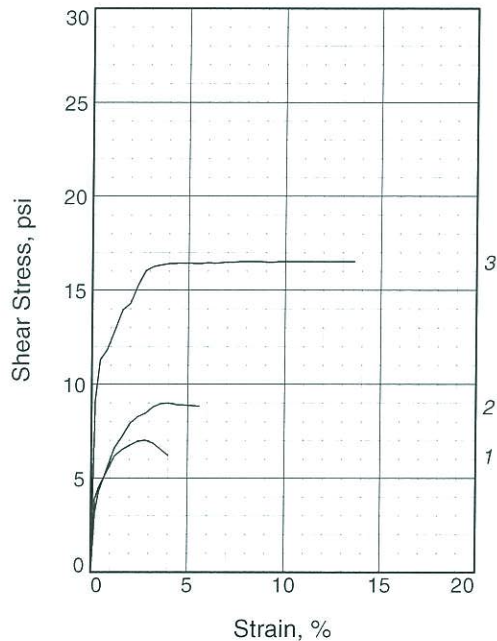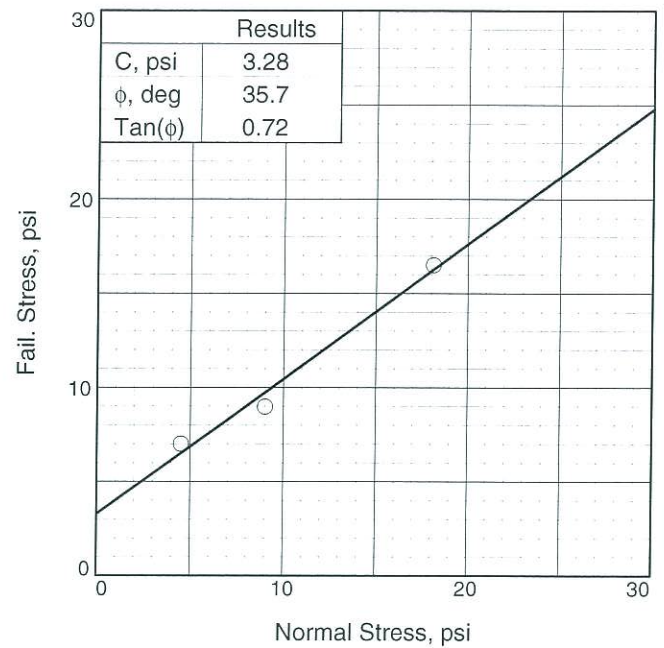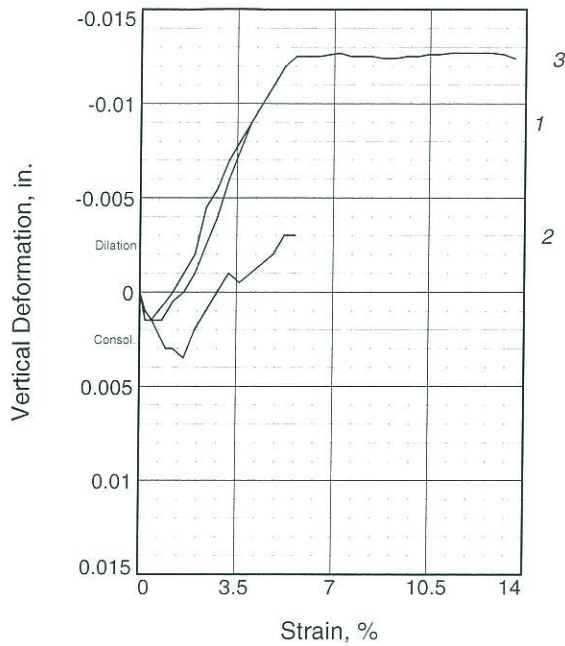
Sample No.		1	2	3
Initial	Water Content, %	18.8	18.7	18.7
	Dry Density, pcf	106.8	106.9	106.9
	Saturation, %	87.9	87.6	87.6
	Void Ratio	0.5784	0.5773	0.5773
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	22.9	24.4	19.6
	Dry Density, pcf	104.1	101.6	110.3
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.6186	0.6593	0.5284
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.03	1.05	0.97
Normal Stress, psi		4.50	9.00	18.10
Fail. Stress, psi		7.02	8.99	16.52
Strain, %		2.8	4.0	7.6
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0007R, S07
Sample Number: S36259   **Depth:** 12.5-14.0
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw/js   **Checked By:** MPW

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019
Project No.: 11-111
Location: S0007R, S07
Depth: 12.5-14.0   **Sample Number:** S36259
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3697.300		3702.900
Moisture content: Dry soil+tare, gms.	3671.400		3671.400
Moisture content: Tare, gms.	3533.800		3533.800
Moisture, %	18.8	22.9	22.9
Moist specimen weight, gms.	163.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.03	
Net decrease in height, in.		-0.03	
Wet density, pcf	126.9	128.0	
Dry density, pcf	106.8	104.1	
Void ratio	0.5784	0.6186	
Saturation, %	87.9	99.9	

Test Readings for Specimen No. 1

**Load ring constant = **.6888 lbs. per input unit
**Normal stress = **4.5 psi
**Strain rate, in./min. = **0.03
Fail. Stress = **7.02 psi **at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	27.900	19.2	0.2	3.91	0.2985
2	0.0100	32.100	22.1	0.4	4.50	0.2985
3	0.0240	40.300	27.8	1.0	5.65	0.2995
4	0.0300	44.000	30.3	1.2	6.17	0.3000
5	0.0400	46.400	32.0	1.6	6.51	0.3010
6	0.0500	48.100	33.1	2.0	6.75	0.3020
7	0.0600	49.600	34.2	2.4	6.96	0.3045
8	0.0700	50.000	34.4	2.8	7.02	0.3055
9	0.0800	48.900	33.7	3.2	6.86	0.3070
10	0.0900	46.500	32.0	3.6	6.52	0.3080
11	0.1000	44.200	30.4	4.0	6.20	0.3090

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3698.100		3705.900
Moisture content: Dry soil+tare, gms.	3672.300		3672.300
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	18.7	24.4	24.4
Moist specimen weight, gms.	163.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.05	
Net decrease in height, in.		-0.05	
Wet density, pcf	126.9	126.4	
Dry density, pcf	106.9	101.6	
Void ratio	0.5773	0.6593	
Saturation, %	87.6	99.9	

Load ring constant = .5434 lbs. per input unit

Normal stress = 9.0 psi

Strain rate, in./min. = 0.03

Fail. Stress = 8.99 psi at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	28.300	15.4	0.2	3.13	0.2990
2	0.0100	38.600	21.0	0.4	4.27	0.2986
3	0.0240	53.400	29.0	1.0	5.91	0.2970
4	0.0300	59.600	32.4	1.2	6.60	0.2970
5	0.0400	65.100	35.4	1.6	7.21	0.2965
6	0.0500	71.400	38.8	2.0	7.90	0.2980
7	0.0600	74.600	40.5	2.4	8.26	0.2990
8	0.0700	76.400	41.5	2.8	8.46	0.3000
9	0.0800	79.400	43.1	3.2	8.79	0.3010
10	0.0900	81.000	44.0	3.6	8.97	0.3005
11	0.1000	81.200	44.1	4.0	8.99	0.3010
12	0.1100	80.500	43.7	4.4	8.91	0.3015
13	0.1200	80.300	43.6	4.8	8.89	0.3020
14	0.1300	80.000	43.5	5.2	8.86	0.3030
15	0.1400	79.800	43.4	5.6	8.83	0.3030

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3698.100		3699.250
Moisture content: Dry soil+tare, gms.	3672.300		3672.300
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	18.7	19.6	19.6
Moist specimen weight, gms.	163.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	126.9	131.9	
Dry density, pcf	106.9	110.3	
Void ratio	0.5773	0.5284	
Saturation, %	87.6	100.0	

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 18.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 16.52 psi at reading no. 20

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	36.300	44.7	0.2	9.11	0.2990
2	0.0110	45.000	55.4	0.4	11.30	0.2985
3	0.0200	47.100	58.0	0.8	11.82	0.2985
4	0.0300	51.300	63.2	1.2	12.88	0.2995
5	0.0400	55.600	68.5	1.6	13.96	0.3000
6	0.0500	57.000	70.2	2.0	14.31	0.3010
7	0.0600	60.900	75.0	2.4	15.29	0.3025
8	0.0700	64.000	78.9	2.8	16.07	0.3040
9	0.0800	64.800	79.8	3.2	16.27	0.3060
10	0.0900	65.100	80.2	3.6	16.34	0.3075
11	0.1000	65.400	80.6	4.0	16.42	0.3090
12	0.1100	65.500	80.7	4.4	16.44	0.3100
13	0.1200	65.500	80.7	4.8	16.44	0.3110
14	0.1300	65.500	80.7	5.2	16.44	0.3120
15	0.1400	65.400	80.6	5.6	16.42	0.3125
16	0.1500	65.600	80.8	6.0	16.47	0.3125
17	0.1600	65.500	80.7	6.4	16.44	0.3125
18	0.1700	65.700	81.0	6.8	16.49	0.3126
19	0.1800	65.700	81.0	7.2	16.49	0.3127
20	0.1900	65.800	81.1	7.6	16.52	0.3125
21	0.2000	65.800	81.1	8.0	16.52	0.3125
22	0.2100	65.800	81.1	8.4	16.52	0.3125
23	0.2200	65.800	81.1	8.8	16.52	0.3124
24	0.2300	65.700	81.0	9.2	16.49	0.3124
25	0.2400	65.800	81.1	9.6	16.52	0.3125
26	0.2500	65.800	81.1	10.0	16.52	0.3125
27	0.2600	65.800	81.1	10.4	16.52	0.3126

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
28	0.2700	65.800	81.1	10.8	16.52	0.3126
29	0.2800	65.800	81.1	11.2	16.52	0.3127
30	0.2900	65.800	81.1	11.6	16.52	0.3127
31	0.3000	65.800	81.1	12.0	16.52	0.3127
32	0.3100	65.800	81.1	12.4	16.52	0.3127
33	0.3200	65.800	81.1	12.8	16.52	0.3127
34	0.3300	65.800	81.1	13.2	16.52	0.3126
35	0.3400	65.800	81.1	13.6	16.52	0.3124

Vertical Deformation, in. vs Strain, %

Dilation / Consol curves labeled 1, 2, 3

Results	
C, psi	0.61
φ, deg	36.3
Tan(φ)	0.74

Fail. Stress, psi vs Normal Stress, psi

Shear Stress, psi vs Strain, %

Sample No.		1	2	3
Initial	Water Content, %	3.9	4.0	3.6
	Dry Density, pcf	116.4	116.3	116.7
	Saturation, %	23.4	23.8	21.8
	Void Ratio	0.4481	0.4491	0.4440
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	16.3	16.1	15.8
	Dry Density, pcf	117.0	117.5	118.1
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.4401	0.4343	0.4271
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.99	0.99
Normal Stress, psi		1.20	2.40	4.70
Fail. Stress, psi		1.55	2.28	4.10
Strain, %		2.9	11.5	7.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0010R, S02
Sample Number: S36261   **Depth:** 5-6.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

                       Fresno to Bakersfield Geotech Investigation

                       #SA-HST019

Project No.:   11-111

Location: S0010R, S02

Depth: 5-6.5   **Sample Number:**   S36261

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2360.000		2377.600
Moisture content: Dry soil+tare, gms.	2354.500		2354.500
Moisture content: Tare, gms.	2212.800		2212.800
Moisture, %	3.9	16.3	16.3
Moist specimen weight, gms.	147.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	120.9	136.1	
Dry density, pcf	116.4	117.0	
Void ratio	0.4481	0.4401	
Saturation, %	23.4	100.0	

Test Readings for Specimen No. 1

Normal stress = 1.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.55 psi **at reading no.** 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	3.900	3.9	0.2	0.84	0.3001
2	0.0100	4.400	4.4	0.4	0.95	0.3002
3	0.0200	5.600	5.6	0.8	1.21	0.3011
4	0.0300	6.000	6.0	1.2	1.29	0.3029
5	0.0430	7.000	7.0	1.8	1.51	0.3035
6	0.0550	7.000	7.0	2.3	1.51	0.3060
7	0.0600	7.000	7.0	2.5	1.51	0.3068
8	0.0700	7.200	7.2	2.9	1.55	0.3078
9	0.0800	7.000	7.0	3.3	1.51	0.3093
10	0.0900	6.900	6.9	3.7	1.49	0.3100
11	0.1000	6.200	6.2	4.1	1.34	0.3111
12	0.1100	6.100	6.1	4.5	1.32	0.3114

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	6.100	6.1	4.9	1.32	0.3120

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2360.000		2377.150
Moisture content: Dry soil+tare, gms.	2354.400		2354.400
Moisture content: Tare, gms.	2212.800		2212.800
Moisture, %	4.0	16.1	16.1
Moist specimen weight, gms.	147.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	120.9	136.4	
Dry density, pcf	116.3	117.5	
Void ratio	0.4491	0.4343	
Saturation, %	23.8	99.9	

Load ring constant = 1.2422 lbs. per input unit

Normal stress = 2.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.28 psi **at reading no.** 29

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	3.000	3.7	0.2	0.80	0.2998
2	0.0100	3.300	4.1	0.4	0.88	0.2994
3	0.0200	3.900	4.8	0.8	1.04	0.2983
4	0.0300	4.200	5.2	1.2	1.12	0.2978
5	0.0400	4.800	6.0	1.6	1.29	0.2963
6	0.0500	5.000	6.2	2.1	1.34	0.2959
7	0.0600	5.100	6.3	2.5	1.37	0.2950
8	0.0740	5.100	6.3	3.0	1.37	0.2947
9	0.0860	5.200	6.5	3.5	1.39	0.2934
10	0.0900	5.300	6.6	3.7	1.42	0.2932
11	0.1000	5.700	7.1	4.1	1.53	0.2930
12	0.1100	5.900	7.3	4.5	1.58	0.2928
13	0.1200	6.100	7.6	4.9	1.63	0.2922
14	0.1330	6.100	7.6	5.5	1.63	0.2920
15	0.1400	6.500	8.1	5.8	1.74	0.2920
16	0.1500	7.000	8.7	6.2	1.87	0.2919
17	0.1600	7.000	8.7	6.6	1.87	0.2919
18	0.1700	7.100	8.8	7.0	1.90	0.2918
19	0.1800	7.200	8.9	7.4	1.93	0.2917
20	0.1950	7.400	9.2	8.0	1.98	0.2916
21	0.2000	7.500	9.3	8.2	2.01	0.2916
22	0.2140	7.700	9.6	8.8	2.06	0.2917

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
23	0.2200	7.700	9.6	9.1	2.06	0.2917
24	0.2300	7.800	9.7	9.5	2.09	0.2916
25	0.2400	7.900	9.8	9.9	2.12	0.2915
26	0.2500	7.900	9.8	10.3	2.12	0.2914
27	0.2600	8.000	9.9	10.7	2.14	0.2912
28	0.2700	8.300	10.3	11.1	2.22	0.2912
29	0.2800	8.500	10.6	11.5	2.28	0.2911
30	0.2900	8.200	10.2	11.9	2.20	0.2911
31	0.3000	8.000	9.9	12.3	2.14	0.2911
32	0.3100	8.000	9.9	12.8	2.14	0.2911
33	0.3200	7.500	9.3	13.2	2.01	0.2911

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2360.000		2377.350
Moisture content: Dry soil+tare, gms.	2354.900		2354.900
Moisture content: Tare, gms.	2212.800		2212.800
Moisture, %	3.6	15.8	15.8
Moist specimen weight, gms.	147.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	120.9	136.8	
Dry density, pcf	116.7	118.1	
Void ratio	0.4440	0.4271	
Saturation, %	21.8	99.9	

Normal stress = 4.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 4.10 psi at reading no. 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.300	5.3	0.2	1.14	0.2997
2	0.0100	10.000	10.0	0.4	2.16	0.2990
3	0.0200	12.700	12.7	0.8	2.74	0.2987
4	0.0300	13.600	13.6	1.2	2.93	0.2986
5	0.0400	14.000	14.0	1.6	3.02	0.2985
6	0.0540	14.200	14.2	2.2	3.06	0.2982
7	0.0600	15.000	15.0	2.5	3.23	0.2980
8	0.0720	15.500	15.5	3.0	3.34	0.2980
9	0.0850	15.900	15.9	3.5	3.43	0.2977
10	0.0940	16.000	16.0	3.9	3.45	0.2973
11	0.1020	16.600	16.6	4.2	3.58	0.2971
12	0.1140	16.800	16.8	4.7	3.62	0.2971
13	0.1250	17.000	17.0	5.1	3.67	0.2970

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
14	0.1320	17.100	17.1	5.4	3.69	0.2970
15	0.1400	17.400	17.4	5.8	3.75	0.2970
16	0.1520	17.900	17.9	6.3	3.86	0.2971
17	0.1600	18.200	18.2	6.6	3.92	0.2971
18	0.1720	18.700	18.7	7.1	4.03	0.2971
19	0.1800	19.000	19.0	7.4	4.10	0.2971
20	0.1900	19.000	19.0	7.8	4.10	0.2972
21	0.2000	18.700	18.7	8.2	4.03	0.2972
22	0.2100	18.900	18.9	8.6	4.08	0.2973
23	0.2200	18.800	18.8	9.1	4.05	0.2974
24	0.2300	18.900	18.9	9.5	4.08	0.2974
25	0.2400	18.800	18.8	9.9	4.05	0.2975
26	0.2500	18.700	18.7	10.3	4.03	0.2975

	Results
C, psi	1.08
φ, deg	34.9
Tan(φ)	0.70
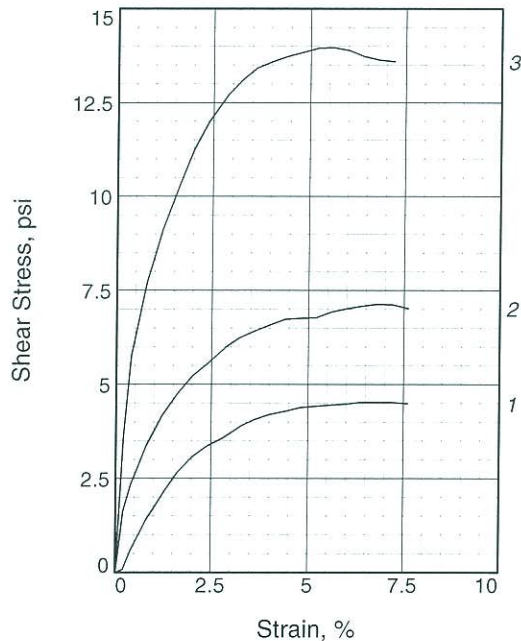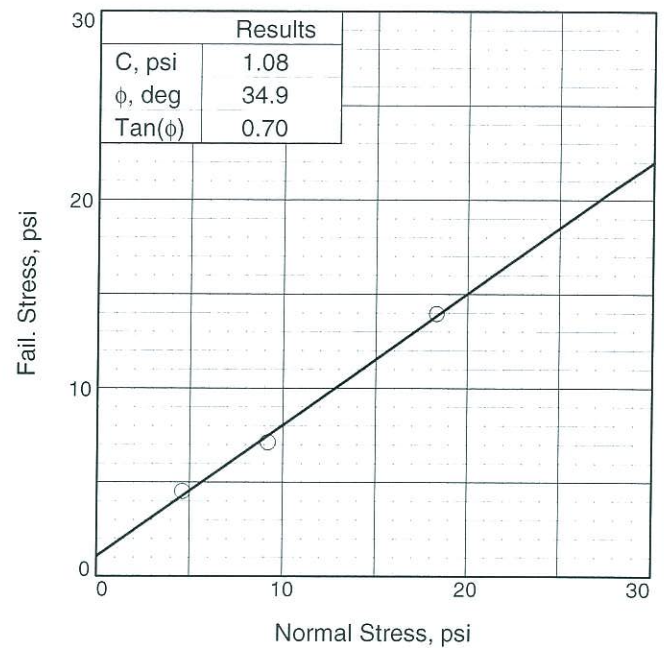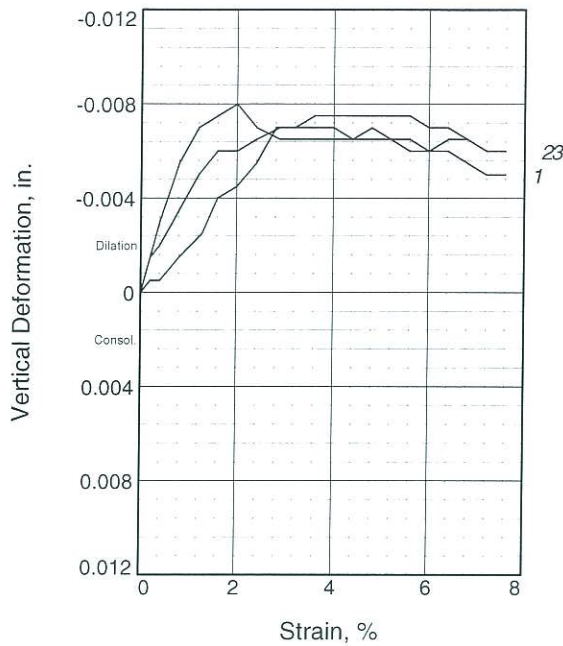
Sample No.		1	2	3
Initial	Water Content, %	17.0	17.0	16.8
	Dry Density, pcf	113.8	113.8	113.9
	Saturation, %	95.2	95.2	94.7
	Void Ratio	0.4815	0.4815	0.4795
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	14.1	14.0	13.9
	Dry Density, pcf	122.2	122.3	122.6
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.3793	0.3785	0.3752
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.93	0.93	0.93
Normal Stress, psi		4.60	9.20	18.30
Fail. Stress, psi		4.53	7.13	13.96
Strain, %		6.4	6.8	5.6
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
   Fresno to Bakersfield Geotech Investigation
Location: S0010R, S09
Sample Number: S36263   **Depth:** 20-21.3
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                         Fresno to Bakersfield Geotech Investigation
                         #SA-HST019
Project No.:   11-111
Location: S0010R, S09
Depth: 20-21.3   **Sample Number:**   S36263
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3705.300		3701.000
Moisture content: Dry soil+tare, gms.	3680.400		3680.400
Moisture content: Tare, gms.	3533.800		3533.800
Moisture, %	17.0	14.1	14.1
Moist specimen weight, gms.	171.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.93	
Net decrease in height, in.		0.07	
Wet density, pcf	133.1	139.4	
Dry density, pcf	113.8	122.2	
Void ratio	0.4815	0.3793	
Saturation, %	95.2	100.0	

Test Readings for Specimen No. 1

Load ring constant = .1213 lbs. per input unit
Normal stress = 4.6 psi
Strain rate, in./min. = 0.03
Fail. Stress = 4.53 psi **at reading no.** 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	3.40	0.4	0.2	0.08	0.0005
2	0.0100	23.70	2.9	0.4	0.59	0.0005
3	0.0200	56.40	6.8	0.8	1.39	0.0015
4	0.0320	87.50	10.6	1.3	2.16	0.0025
5	0.0400	106.80	13.0	1.6	2.64	0.0040
6	0.0500	124.10	15.1	2.0	3.07	0.0045
7	0.0600	136.20	16.5	2.4	3.37	0.0055
8	0.0700	145.00	17.6	2.8	3.58	0.0070
9	0.0820	158.00	19.2	3.3	3.90	0.0070
10	0.0900	164.60	20.0	3.6	4.07	0.0070
11	0.1000	170.00	20.6	4.0	4.20	0.0070

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	173.40	21.0	4.4	4.28	0.0065
13	0.1200	177.50	21.5	4.8	4.39	0.0070
14	0.1300	178.90	21.7	5.2	4.42	0.0065
15	0.1400	180.20	21.9	5.6	4.45	0.0065
16	0.1500	181.50	22.0	6.0	4.49	0.0060
17	0.1600	183.30	22.2	6.4	4.53	0.0060
18	0.1700	183.10	22.2	6.8	4.52	0.0055
19	0.1800	183.00	22.2	7.2	4.52	0.0050
20	0.1900	181.60	22.0	7.6	4.49	0.0050

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3717.100		3712.750
Moisture content: Dry soil+tare, gms.	3692.200		3692.200
Moisture content: Tare, gms.	3545.600		3545.600
Moisture, %	17.0	14.0	14.0
Moist specimen weight, gms.	171.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.93	
Net decrease in height, in.		0.07	
Wet density, pcf	133.1	139.4	
Dry density, pcf	113.8	122.3	
Void ratio	0.4815	0.3785	
Saturation, %	95.2	100.0	

Load ring constant = .1819 lbs. per input unit

Normal stress = 9.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 7.13 psi at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	44.00	8.0	0.2	1.63	0.0015
2	0.0100	63.00	11.5	0.4	2.33	0.0020
3	0.0200	90.90	16.5	0.8	3.37	0.0035
4	0.0300	112.10	20.4	1.2	4.15	0.0050
5	0.0400	128.00	23.3	1.6	4.74	0.0060
6	0.0500	141.00	25.6	2.0	5.22	0.0060
7	0.0600	150.00	27.3	2.4	5.56	0.0065
8	0.0720	162.30	29.5	2.9	6.01	0.0070
9	0.0800	168.20	30.6	3.2	6.23	0.0070
10	0.0900	173.20	31.5	3.6	6.42	0.0075
11	0.1000	177.60	32.3	4.0	6.58	0.0075
12	0.1100	181.80	33.1	4.4	6.74	0.0075
13	0.1200	182.40	33.2	4.8	6.76	0.0075
14	0.1300	183.00	33.3	5.2	6.78	0.0075

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
15	0.1400	187.00	34.0	5.6	6.93	0.0075
16	0.1500	189.40	34.5	6.0	7.02	0.0070
17	0.1600	191.30	34.8	6.4	7.09	0.0070
18	0.1700	192.50	35.0	6.8	7.13	0.0065
19	0.1800	192.10	34.9	7.2	7.12	0.0060
20	0.1900	189.50	34.5	7.6	7.02	0.0060

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3706.100		3701.800
Moisture content: Dry soil+tare, gms.	3681.400		3681.400
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	16.8	13.9	13.9
Moist specimen weight, gms.	171.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.93	
Net decrease in height, in.		0.07	
Wet density, pcf	133.1	139.6	
Dry density, pcf	113.9	122.6	
Void ratio	0.4795	0.3752	
Saturation, %	94.7	100.0	

Load ring constant = .5000 lbs. per input unit

Normal stress = 18.3 psi

Strain rate, in./min. = 0.03

Fail. Stress = 13.96 psi at reading no. 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	35.10	17.6	0.2	3.58	0.0015
2	0.0100	56.70	28.4	0.4	5.78	0.0030
3	0.0200	75.90	38.0	0.8	7.73	0.0055
4	0.0300	89.60	44.8	1.2	9.13	0.0070
5	0.0400	100.40	50.2	1.6	10.23	0.0075
6	0.0500	110.30	55.1	2.0	11.24	0.0080
7	0.0600	117.90	59.0	2.4	12.01	0.0070
8	0.0720	124.90	62.5	2.9	12.72	0.0065
9	0.0800	128.30	64.2	3.2	13.07	0.0065
10	0.0900	131.70	65.8	3.6	13.41	0.0065
11	0.1000	133.40	66.7	4.0	13.59	0.0065
12	0.1100	134.80	67.4	4.4	13.73	0.0065
13	0.1200	135.90	68.0	4.8	13.84	0.0065
14	0.1300	137.00	68.5	5.2	13.95	0.0065
15	0.1400	137.10	68.5	5.6	13.96	0.0060
16	0.1500	136.40	68.2	6.0	13.89	0.0060
17	0.1600	134.80	67.4	6.4	13.73	0.0065

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
18	0.1700	133.90	67.0	6.8	13.64	0.0065
19	0.1800	133.50	66.8	7.2	13.60	0.0060

Results

C, psi	2.02
φ, deg	39.1
Tan(φ)	0.81

Vertical Deformation, in. vs Strain, % (upper left chart)

Fail. Stress, psi vs Normal Stress, psi (upper right chart)

Shear Stress, psi vs Strain, % (lower left chart)

Sample No.		1	2	3
Initial	Water Content, %	19.3	19.3	19.1
	Dry Density, pcf	100.7	100.6	100.8
	Saturation, %	77.2	77.2	76.8
	Void Ratio	0.6745	0.6747	0.6722
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	22.5	22.5	22.1
	Dry Density, pcf	104.9	104.8	105.7
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6067	0.6086	0.5953
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.96	0.96	0.95
Normal Stress, psi		7.80	15.60	31.10
Fail. Stress, psi		8.28	14.82	27.25
Strain, %		8.0	3.2	8.0
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0010R, S12
Sample Number: S36265   **Depth:** 35-36.4
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0010R, S12

Depth: 35-36.4   **Sample Number:**   S36265

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3688.900		3693.050
Moisture content: Dry soil+tare, gms.	3663.900		3663.900
Moisture content: Tare, gms.	3534.200		3534.200
Moisture, %	19.3	22.5	22.5
Moist specimen weight, gms.	154.7		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	120.1	128.5	
Dry density, pcf	100.7	104.9	
Void ratio	0.6745	0.6067	
Saturation, %	77.2	100.0	

Test Readings for Specimen No. 1

Load ring constant = .2531 lbs. per input unit

Normal stress = 7.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 8.28 psi **at reading no.** 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	41.60	10.5	0.2	2.14	0.0035
2	0.0100	63.60	16.1	0.4	3.28	0.0045
3	0.0200	86.40	21.9	0.8	4.45	0.0060
4	0.0300	109.60	27.7	1.2	5.65	0.0075
5	0.0430	120.20	30.4	1.7	6.20	0.0090
6	0.0500	127.20	32.2	2.0	6.56	0.0095
7	0.0600	129.00	32.6	2.4	6.65	0.0100
8	0.0740	145.40	36.8	3.0	7.50	0.0105
9	0.0800	147.80	37.4	3.2	7.62	0.0105
10	0.0900	149.60	37.9	3.6	7.71	0.0105
11	0.1000	151.40	38.3	4.0	7.81	0.0105

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	152.30	38.5	4.4	7.85	0.0105
13	0.1200	153.00	38.7	4.8	7.89	0.0105
14	0.1320	155.60	39.4	5.3	8.02	0.0095
15	0.1400	157.10	39.8	5.6	8.10	0.0095
16	0.1500	158.50	40.1	6.0	8.17	0.0090
17	0.1600	158.80	40.2	6.4	8.19	0.0085
18	0.1700	159.70	40.4	6.8	8.23	0.0085
19	0.1800	160.00	40.5	7.2	8.25	0.0085
20	0.1900	160.30	40.6	7.6	8.27	0.0080
21	0.2000	160.50	40.6	8.0	8.28	0.0075
22	0.2100	160.10	40.5	8.4	8.25	0.0065
23	0.2200	159.60	40.4	8.8	8.23	0.0060
24	0.2300	157.70	39.9	9.2	8.13	0.0055
25	0.2400	155.80	39.4	9.6	8.03	0.0055

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3692.300		3696.600
Moisture content: Dry soil+tare, gms.	3666.800		3666.800
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	19.3	22.5	22.5
Moist specimen weight, gms.	154.7		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	120.1	128.4	
Dry density, pcf	100.6	104.8	
Void ratio	0.6747	0.6086	
Saturation, %	77.2	100.0	

Load ring constant = .3348 lbs. per input unit

Normal stress = 15.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 14.82 psi at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	104.00	34.8	0.2	7.09	0.0030
2	0.0100	125.90	42.2	0.4	8.59	0.0040
3	0.0200	154.00	51.6	0.8	10.50	0.0050
4	0.0300	167.30	56.0	1.2	11.41	0.0050
5	0.0400	188.60	63.1	1.6	12.86	0.0050
6	0.0500	203.00	68.0	2.0	13.85	0.0050
7	0.0600	207.30	69.4	2.4	14.14	0.0050
8	0.0700	213.00	71.3	2.8	14.53	0.0045
9	0.0800	217.30	72.8	3.2	14.82	0.0040

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
10	0.0900	217.10	72.7	3.6	14.81	0.0035
11	0.1000	215.30	72.1	4.0	14.68	0.0035
12	0.1100	213.60	71.5	4.4	14.57	0.0025
13	0.1200	211.70	70.9	4.8	14.44	0.0025
14	0.1300	210.00	70.3	5.2	14.32	0.0025

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3692.300		3696.200
Moisture content: Dry soil+tare, gms.	3667.000		3667.000
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	19.1	22.1	22.1
Moist specimen weight, gms.	154.7		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	120.1	129.0	
Dry density, pcf	100.8	105.7	
Void ratio	0.6722	0.5953	
Saturation, %	76.8	100.0	

Load ring constant = .6435 lbs. per input unit

Normal stress = 31.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 27.25 psi at reading no. 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.0000
1	0.0070	34.000	21.9	0.3	4.46	0.0015
2	0.0100	43.100	27.7	0.4	5.65	0.0015
3	0.0200	75.200	48.4	0.8	9.86	0.0025
4	0.0300	98.200	63.2	1.2	12.87	0.0035
5	0.0400	117.600	75.7	1.6	15.42	0.0045
6	0.0550	139.000	89.4	2.2	18.22	0.0050
7	0.0600	144.900	93.2	2.4	19.00	0.0055
8	0.0700	155.700	100.2	2.8	20.41	0.0055
9	0.0800	162.500	104.6	3.2	21.30	0.0060
10	0.0900	171.300	110.2	3.6	22.46	0.0055
11	0.1000	181.000	116.5	4.0	23.73	0.0050
12	0.1100	188.600	121.4	4.4	24.72	0.0050
13	0.1200	194.500	125.2	4.8	25.50	0.0050
14	0.1320	198.700	127.9	5.3	26.05	0.0040
15	0.1400	201.700	129.8	5.6	26.44	0.0040
16	0.1500	204.000	131.3	6.0	26.74	0.0035
17	0.1600	205.000	131.9	6.4	26.87	0.0030
18	0.1700	206.900	133.1	6.8	27.12	0.0025

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
19	0.1800	207.100	133.3	7.2	27.15	0.0020
20	0.1900	207.800	133.7	7.6	27.24	0.0015
21	0.2000	207.900	133.8	8.0	27.25	0.0010
22	0.2100	207.800	133.7	8.4	27.24	0.0005
23	0.2250	205.000	131.9	9.0	26.87	0.0005
24	0.2300	204.600	131.7	9.2	26.82	0.0005
25	0.2400	204.000	131.3	9.6	26.74	0.0010

Results	
C, psi	1.63
φ, deg	41.4
Tan(φ)	0.88
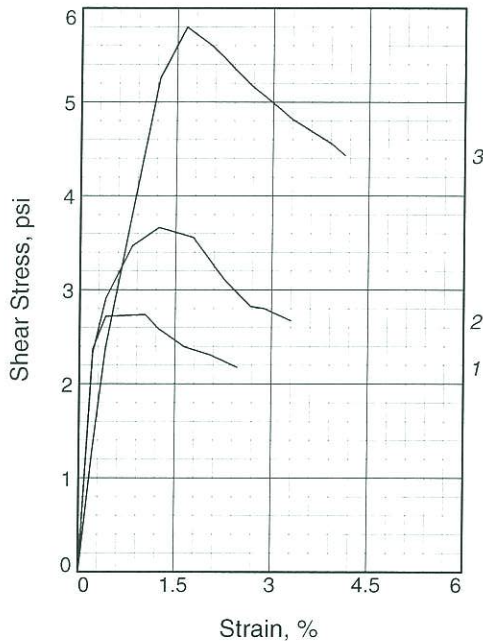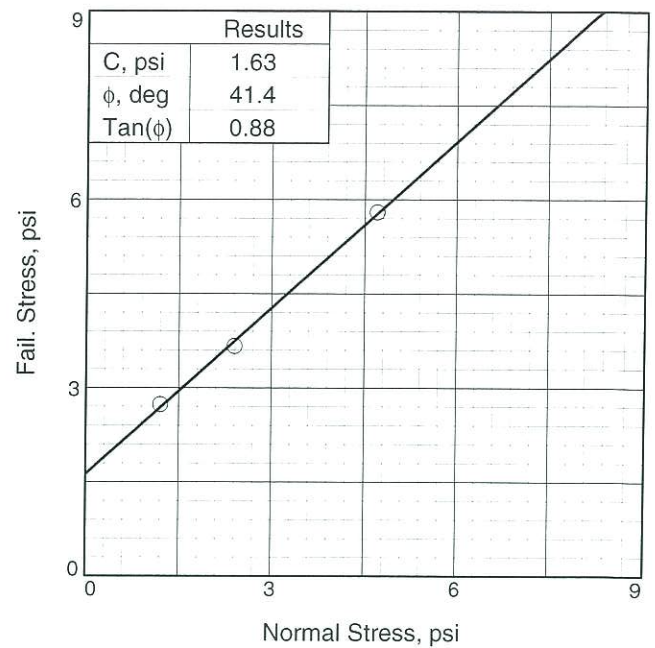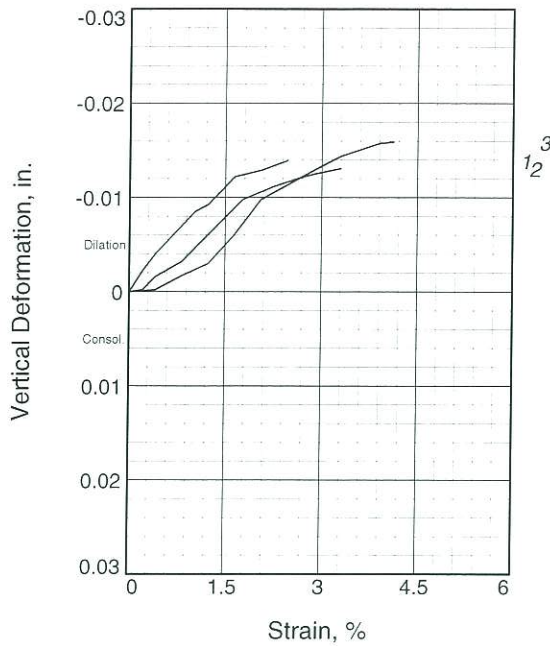
Sample No.		1	2	3
Initial	Water Content, %	11.1	11.5	11.0
	Dry Density, pcf	123.3	122.8	123.4
	Saturation, %	81.3	83.4	81.0
	Void Ratio	0.3671	0.3725	0.3661
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.5	13.5	13.3
	Dry Density, pcf	123.4	123.5	123.9
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.3657	0.3647	0.3600
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	1.00
Normal Stress, psi		1.20	2.40	4.70
Fail. Stress, psi		2.74	3.67	5.80
Strain, %		1.0	1.2	1.6
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
   Fresno to Bakersfield Geotech Investigation
Location: S0012R, S02
Sample Number: S36267   **Depth:** 5-6.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0012R, S02

Depth: 5-6.5   **Sample Number:**   S36267

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.000		2366.700
Moisture content: Dry soil+tare, gms.	2346.400		2346.400
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	11.1	13.5	13.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	140.1	
Dry density, pcf	123.3	123.4	
Void ratio	0.3671	0.3657	
Saturation, %	81.3	99.9	

Test Readings for Specimen No. 1

Normal stress = 1.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.74 psi **at reading no.** 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	11.000	11.0	0.2	2.37	0.3022
2	0.0100	12.600	12.6	0.4	2.72	0.3040
3	0.0250	12.700	12.7	1.0	2.74	0.3085
4	0.0300	12.000	12.0	1.2	2.59	0.3093
5	0.0400	11.100	11.1	1.6	2.39	0.3122
6	0.0500	10.700	10.7	2.1	2.31	0.3129
7	0.0600	10.100	10.1	2.5	2.18	0.3139

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.000		2366.000
Moisture content: Dry soil+tare, gms.	2345.800		2345.800
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	11.5	13.5	13.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	136.9	140.2	
Dry density, pcf	122.8	123.5	
Void ratio	0.3725	0.3647	
Saturation, %	83.4	100.0	

Normal stress = 2.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.67 psi **at reading no.** 4

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	10.800	10.8	0.2	2.33	0.3002
2	0.0100	13.500	13.5	0.4	2.91	0.3016
3	0.0200	16.100	16.1	0.8	3.47	0.3032
4	0.0300	17.000	17.0	1.2	3.67	0.3061
5	0.0430	16.500	16.5	1.8	3.56	0.3098
6	0.0550	14.400	14.4	2.3	3.10	0.3112
7	0.0650	13.100	13.1	2.7	2.82	0.3121
8	0.0700	13.000	13.0	2.9	2.80	0.3125
9	0.0800	12.400	12.4	3.3	2.67	0.3131

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.600		2367.100
Moisture content: Dry soil+tare, gms.	2347.100		2347.100
Moisture content: Tare, gms.	2196.900		2196.900
Moisture, %	11.0	13.3	13.3
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	140.4	
Dry density, pcf	123.4	123.9	
Void ratio	0.3661	0.3600	
Saturation, %	81.0	99.9	

Load ring constant = .8127 lbs. per input unit

Normal stress = 4.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 5.80 psi at reading no. 5

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.400	6.0	0.2	1.30	0.3001
2	0.0100	13.600	11.1	0.4	2.38	0.3002
3	0.0200	21.800	17.7	0.8	3.82	0.3017
4	0.0300	30.000	24.4	1.2	5.26	0.3030
5	0.0400	33.100	26.9	1.6	5.80	0.3061
6	0.0500	31.900	25.9	2.1	5.59	0.3098
7	0.0650	29.500	24.0	2.7	5.17	0.3121
8	0.0720	28.600	23.2	3.0	5.01	0.3132
9	0.0800	27.500	22.3	3.3	4.82	0.3144
10	0.0950	26.000	21.1	3.9	4.56	0.3158
11	0.1000	25.300	20.6	4.1	4.43	0.3159

Results

C, psi	2.17
φ, deg	42.8
Tan(φ)	0.93

Vertical Deformation, in. — Strain, %
Dilation / Consol.

Fail. Stress, psi — Normal Stress, psi

Shear Stress, psi — Strain, %
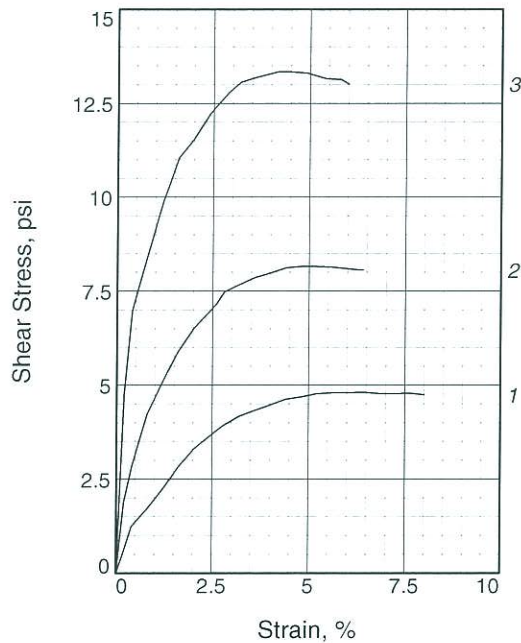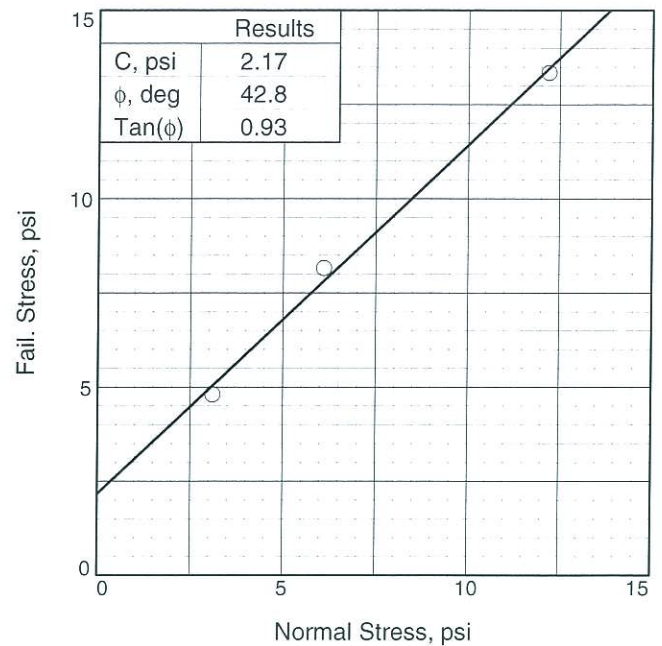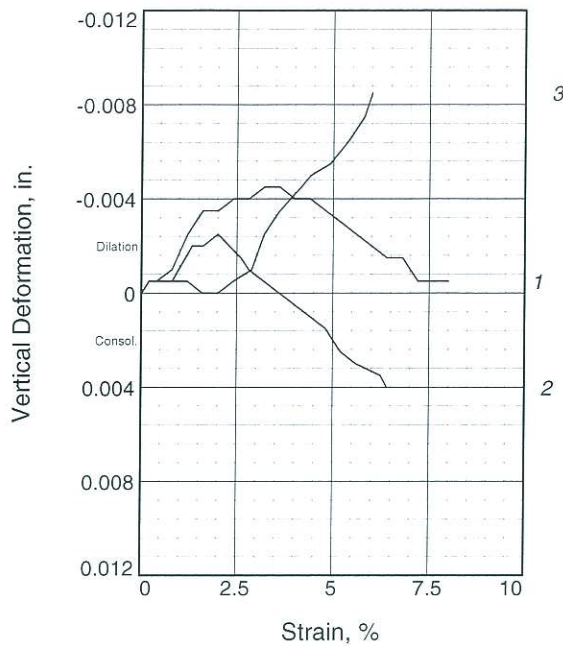
Sample No.		1	2	3
Initial	Water Content, %	18.6	18.6	18.4
	Dry Density, pcf	110.5	110.5	110.7
	Saturation, %	95.7	95.7	95.2
	Void Ratio	0.5252	0.5252	0.5231
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	16.0	16.4	22.3
	Dry Density, pcf	117.6	116.8	105.1
	Saturation, %	99.9	100.0	100.0
	Void Ratio	0.4329	0.4428	0.6030
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.94	0.95	1.05
Normal Stress, psi		3.10	6.10	12.20
Fail. Stress, psi		4.81	8.16	13.35
Strain, %		6.4	4.8	4.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0012R, S07
Sample Number: S36268   **Depth:** 12.5-13.8
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: MW   **Checked By:** MPW

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0012R, S07

Depth: 12.5-13.8   **Sample Number:**   S36268

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3703.500		3699.800
Moisture content: Dry soil+tare, gms.	3677.000		3677.000
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	18.6	16.0	16.0
Moist specimen weight, gms.	168.9		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	131.1	136.5	
Dry density, pcf	110.5	117.6	
Void ratio	0.5252	0.4329	
Saturation, %	95.7	99.9	

Test Readings for Specimen No. 1

Load ring constant = .1323 lbs. per input unit

Normal stress = 3.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 4.81 psi **at reading no.** 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	21.20	2.8	0.2	0.57	0.0005
2	0.0100	46.10	6.1	0.4	1.24	0.0005
3	0.0200	63.40	8.4	0.8	1.71	0.0010
4	0.0300	82.50	10.9	1.2	2.22	0.0025
5	0.0400	104.00	13.8	1.6	2.80	0.0035
6	0.0500	121.60	16.1	2.0	3.28	0.0035
7	0.0600	134.50	17.8	2.4	3.63	0.0040
8	0.0700	146.20	19.3	2.8	3.94	0.0040
9	0.0800	155.00	20.5	3.2	4.18	0.0045
10	0.0900	160.50	21.2	3.6	4.33	0.0045
11	0.1000	166.00	22.0	4.0	4.47	0.0040

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	171.50	22.7	4.4	4.62	0.0040
13	0.1200	174.00	23.0	4.8	4.69	0.0035
14	0.1300	176.90	23.4	5.2	4.77	0.0030
15	0.1400	178.00	23.5	5.6	4.80	0.0025
16	0.1500	178.00	23.5	6.0	4.80	0.0020
17	0.1600	178.50	23.6	6.4	4.81	0.0015
18	0.1700	177.40	23.5	6.8	4.78	0.0015
19	0.1800	177.00	23.4	7.2	4.77	0.0005
20	0.1900	177.50	23.5	7.6	4.78	0.0005
21	0.2000	176.10	23.3	8.0	4.75	0.0005

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3703.500		3700.350
Moisture content: Dry soil+tare, gms.	3677.000		3677.000
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	18.6	16.4	16.4
Moist specimen weight, gms.	168.9		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	131.1	136.0	
Dry density, pcf	110.5	116.8	
Void ratio	0.5252	0.4428	
Saturation, %	95.7	100.0	

Load ring constant = .1943 lbs. per input unit

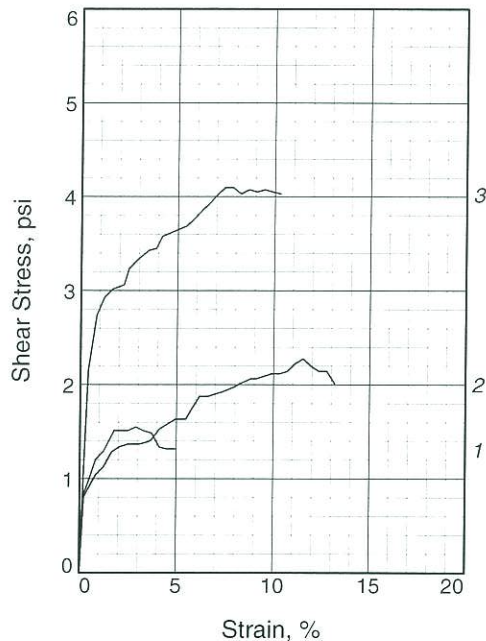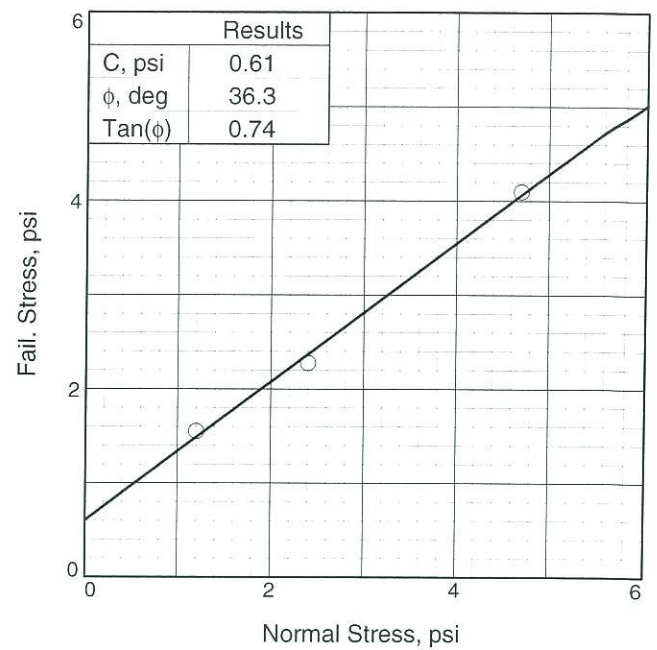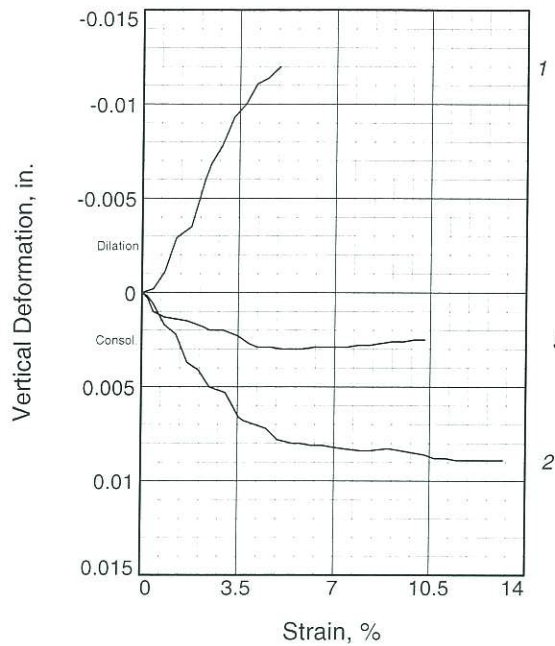Normal stress = 6.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 8.16 psi at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	47.50	9.2	0.2	1.88	0.0005
2	0.0100	71.20	13.8	0.4	2.82	0.0005
3	0.0200	107.10	20.8	0.8	4.24	0.0005
4	0.0330	135.10	26.2	1.3	5.35	0.0020
5	0.0400	149.00	29.0	1.6	5.90	0.0020
6	0.0500	164.10	31.9	2.0	6.50	0.0025
7	0.0650	181.00	35.2	2.6	7.16	0.0015
8	0.0700	189.20	36.8	2.8	7.49	0.0010
9	0.0800	194.00	37.7	3.2	7.68	0.0005
10	0.0900	198.70	38.6	3.6	7.87	0.0000
11	0.1000	201.70	39.2	4.0	7.98	-0.0005
12	0.1100	205.20	39.9	4.4	8.12	-0.0010
13	0.1200	206.10	40.0	4.8	8.16	-0.0015

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
14	0.1300	206.00	40.0	5.2	8.15	-0.0025
15	0.1400	205.60	39.9	5.6	8.14	-0.0030
16	0.1560	204.00	39.6	6.2	8.07	-0.0035
17	0.1600	203.80	39.6	6.4	8.07	-0.0040

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	3703.500		3709.050
Moisture content: Dry soil+tare, gms.	3677.200		3677.200
Moisture content: Tare, gms.	3534.600		3534.600
Moisture, %	18.4	22.3	22.3
Moist specimen weight, gms.	168.9		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.05	
Net decrease in height, in.		-0.05	
Wet density, pcf	131.1	128.6	
Dry density, pcf	110.7	105.1	
Void ratio	0.5231	0.6030	
Saturation, %	95.2	100.0	

Load ring constant = .2828 lbs. per input unit

Normal stress = 12.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 13.35 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.00	0.0	0.0	0.00	0.0000
1	0.0050	82.60	23.4	0.2	4.76	0.0005
2	0.0100	121.00	34.2	0.4	6.97	0.0005
3	0.0200	147.00	41.6	0.8	8.47	0.0005
4	0.0300	172.00	48.6	1.2	9.91	0.0005
5	0.0400	191.90	54.3	1.6	11.06	0.0000
6	0.0500	200.70	56.8	2.0	11.56	0.0000
7	0.0600	212.00	60.0	2.4	12.21	0.0005
8	0.0720	222.00	62.8	2.9	12.79	0.0010
9	0.0800	226.80	64.1	3.2	13.07	0.0025
10	0.0900	229.00	64.8	3.6	13.19	0.0035
11	0.1040	231.50	65.5	4.2	13.34	0.0045
12	0.1100	231.70	65.5	4.4	13.35	0.0050
13	0.1230	231.00	65.3	4.9	13.31	0.0055
14	0.1350	228.40	64.6	5.4	13.16	0.0065
15	0.1450	228.00	64.5	5.8	13.14	0.0075
16	0.1500	226.00	63.9	6.0	13.02	0.0085

	Results
C, psi	0.17
ϕ, deg	36.7
Tan(ϕ)	0.75
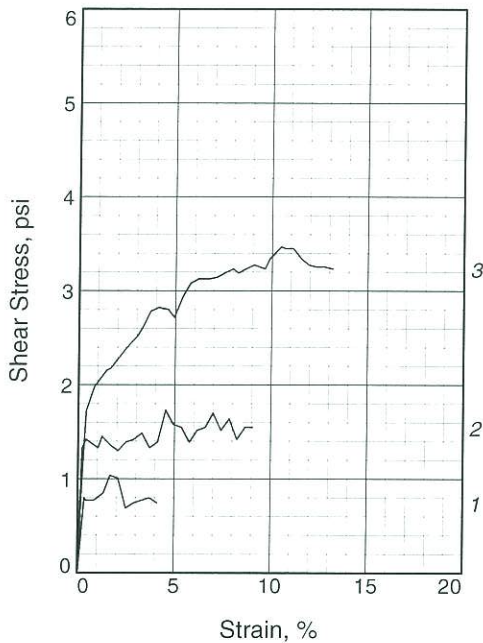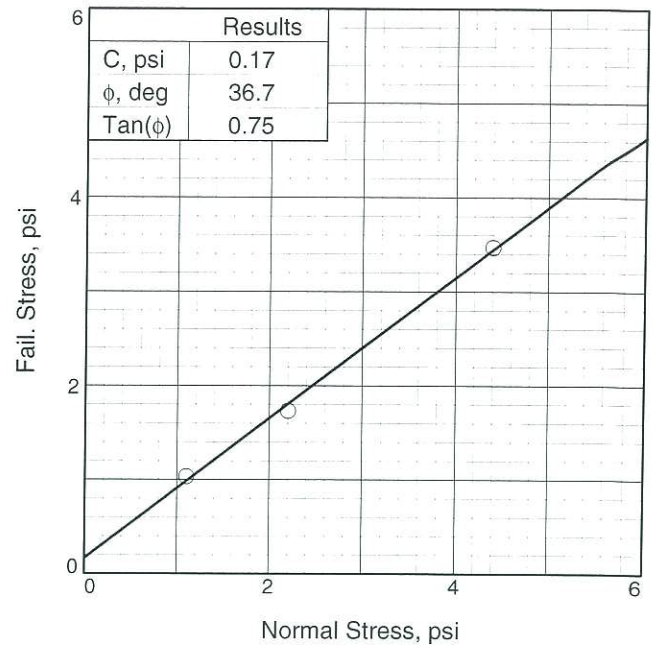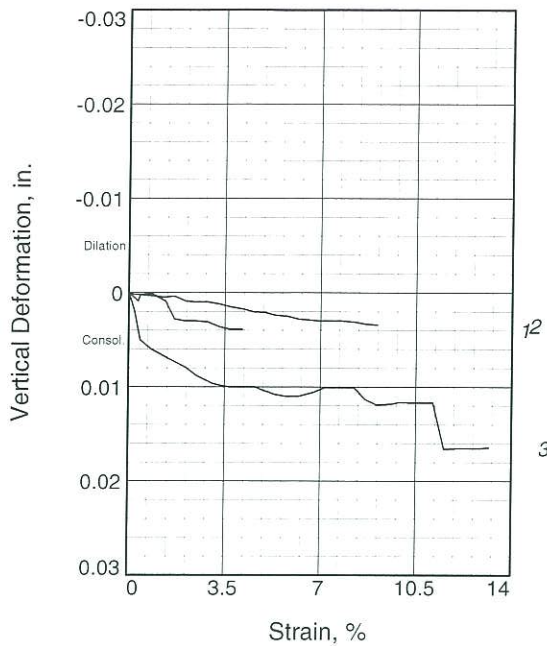
Sample No.		1	2	3
Initial	Water Content, %	8.2	8.1	8.0
	Dry Density, pcf	95.1	95.2	95.3
	Saturation, %	28.7	28.4	28.2
	Void Ratio	0.7720	0.7705	0.7689
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	28.2	28.2	27.4
	Dry Density, pcf	95.7	95.6	96.8
	Saturation, %	99.9	99.9	99.9
	Void Ratio	0.7619	0.7627	0.7406
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	1.00	0.98
Normal Stress, psi		1.10	2.20	4.40
Fail. Stress, psi		1.04	1.73	3.47
Strain, %		1.6	4.5	10.5
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0014R, S02
Sample Number: S36278   **Depth:** 5-6.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0014R, S02

Depth: 5-6.5   **Sample Number:**   S36278

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2338.200		2361.350
Moisture content: Dry soil+tare, gms.	2328.700		2328.700
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	8.2	28.2	28.2
Moist specimen weight, gms.	125.3		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	102.9	122.6	
Dry density, pcf	95.1	95.7	
Void ratio	0.7720	0.7619	
Saturation, %	28.7	99.9	

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 1.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.04 psi **at reading no.** 5

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0080	3.000	3.7	0.3	0.80	0.2991
2	0.0100	2.900	3.6	0.4	0.77	0.2998
3	0.0200	2.900	3.6	0.8	0.77	0.2999
4	0.0320	3.200	3.9	1.3	0.85	0.2991
5	0.0400	3.900	4.8	1.6	1.04	0.2972
6	0.0500	3.800	4.7	2.1	1.01	0.2970
7	0.0600	2.600	3.2	2.5	0.69	0.2970
8	0.0700	2.800	3.5	2.9	0.74	0.2969
9	0.0800	2.900	3.6	3.3	0.77	0.2964
10	0.0900	3.000	3.7	3.7	0.80	0.2961
11	0.1000	2.800	3.5	4.1	0.74	0.2961

Sierra Testing Labs, Inc.

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2322.500		2345.800
Moisture content: Dry soil+tare, gms.	2313.100		2313.100
Moisture content: Tare, gms.	2197.200		2197.200
Moisture, %	8.1	28.2	28.2
Moist specimen weight, gms.	125.3		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	102.9	122.6	
Dry density, pcf	95.2	95.6	
Void ratio	0.7705	0.7627	
Saturation, %	28.4	99.9	

Load ring constant = 1.4343 lbs. per input unit

Normal stress = 2.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.73 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.300	6.2	0.2	1.33	0.2998
2	0.0100	4.600	6.6	0.4	1.42	0.2998
3	0.0250	4.300	6.2	1.0	1.33	0.2996
4	0.0300	4.700	6.7	1.2	1.45	0.2995
5	0.0400	4.400	6.3	1.6	1.36	0.2996
6	0.0500	4.200	6.0	2.1	1.30	0.2991
7	0.0600	4.500	6.5	2.5	1.39	0.2990
8	0.0700	4.600	6.6	2.9	1.42	0.2990
9	0.0800	4.800	6.9	3.3	1.48	0.2988
10	0.0900	4.300	6.2	3.7	1.33	0.2985
11	0.1000	4.500	6.5	4.1	1.39	0.2983
12	0.1100	5.600	8.0	4.5	1.73	0.2980
13	0.1200	5.100	7.3	4.9	1.58	0.2979
14	0.1300	5.000	7.2	5.3	1.55	0.2976
15	0.1400	4.500	6.5	5.8	1.39	0.2975
16	0.1500	4.900	7.0	6.2	1.52	0.2972
17	0.1600	5.000	7.2	6.6	1.55	0.2971
18	0.1700	5.500	7.9	7.0	1.70	0.2970
19	0.1800	4.900	7.0	7.4	1.52	0.2970
20	0.1900	5.300	7.6	7.8	1.64	0.2970
21	0.2000	4.600	6.6	8.2	1.42	0.2969
22	0.2100	5.000	7.2	8.6	1.55	0.2967
23	0.2200	5.000	7.2	9.1	1.55	0.2966

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2338.200		2360.700
Moisture content: Dry soil+tare, gms.	2328.900		2328.900
Moisture content: Tare, gms.	2212.900		2212.900
Moisture, %	8.0	27.4	27.4
Moist specimen weight, gms.	125.3		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	102.9	123.4	
Dry density, pcf	95.3	96.8	
Void ratio	0.7689	0.7406	
Saturation, %	28.2	99.9	

Normal stress = 4.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.47 psi at reading no. 26

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.700	4.7	0.2	1.01	0.2981
2	0.0100	8.000	8.0	0.4	1.72	0.2950
3	0.0200	9.200	9.2	0.8	1.98	0.2940
4	0.0350	10.000	10.0	1.4	2.16	0.2930
5	0.0400	10.100	10.1	1.6	2.18	0.2927
6	0.0500	10.600	10.6	2.1	2.29	0.2921
7	0.0600	11.100	11.1	2.5	2.39	0.2912
8	0.0740	11.700	11.7	3.0	2.52	0.2904
9	0.0800	12.100	12.1	3.3	2.61	0.2902
10	0.0900	12.900	12.9	3.7	2.78	0.2900
11	0.1000	13.100	13.1	4.1	2.82	0.2900
12	0.1120	13.000	13.0	4.6	2.80	0.2900
13	0.1200	12.600	12.6	4.9	2.72	0.2896
14	0.1300	13.600	13.6	5.3	2.93	0.2892
15	0.1400	14.300	14.3	5.8	3.08	0.2890
16	0.1500	14.500	14.5	6.2	3.13	0.2890
17	0.1630	14.500	14.5	6.7	3.13	0.2894
18	0.1740	14.600	14.6	7.2	3.15	0.2899
19	0.1830	14.800	14.8	7.5	3.19	0.2899
20	0.1940	15.000	15.0	8.0	3.23	0.2899
21	0.2000	14.800	14.8	8.2	3.19	0.2899
22	0.2100	15.000	15.0	8.6	3.23	0.2887
23	0.2200	15.200	15.2	9.1	3.28	0.2881
24	0.2340	15.000	15.0	9.6	3.23	0.2882
25	0.2400	15.500	15.5	9.9	3.34	0.2884
26	0.2550	16.100	16.1	10.5	3.47	0.2883
27	0.2600	16.000	16.0	10.7	3.45	0.2883
28	0.2700	16.000	16.0	11.1	3.45	0.2883

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
29	0.2800	15.500	15.5	11.5	3.34	0.2834
30	0.2900	15.200	15.2	11.9	3.28	0.2835
31	0.3000	15.100	15.1	12.3	3.26	0.2835
32	0.3100	15.100	15.1	12.8	3.26	0.2835
33	0.3200	15.000	15.0	13.2	3.23	0.2836

Results

C, psi	1.87
φ, deg	43.0
Tan(φ)	0.93

Top-left graph: Vertical Deformation, in. vs Strain, % (curves labeled 1, 2, 3; Dilation / Consol.)

Top-right graph: Fail. Stress, psi vs Normal Stress, psi

Bottom-left graph: Shear Stress, psi vs Strain, % (curves labeled 1, 2, 3)
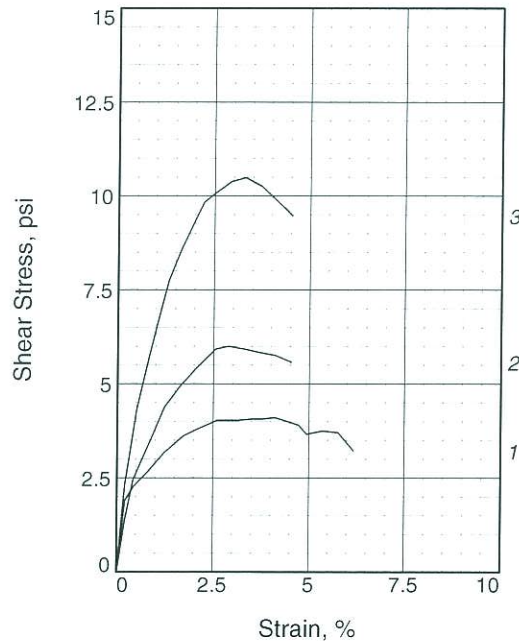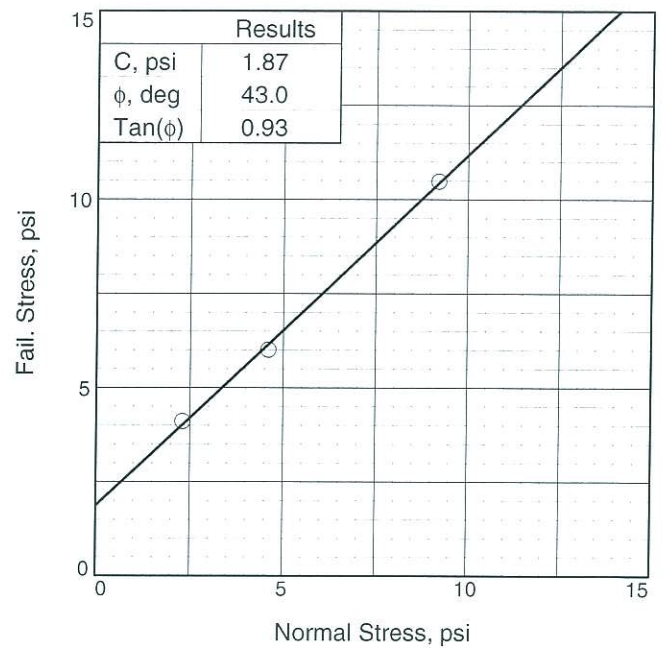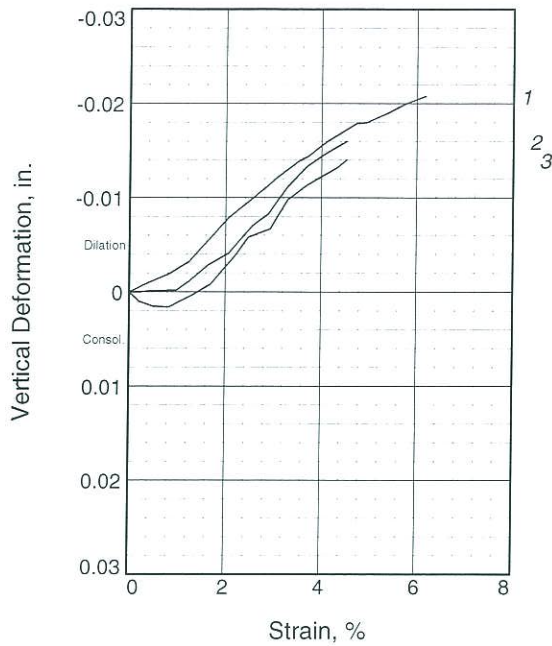
Sample No.		1	2	3
Initial	Water Content, %	13.8	13.9	13.7
	Dry Density, pcf	120.3	120.3	120.4
	Saturation, %	92.9	93.2	92.6
	Void Ratio	0.4007	0.4016	0.3997
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	14.8	14.4	14.3
	Dry Density, pcf	120.5	121.4	121.6
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.3988	0.3887	0.3864
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
Normal Stress, psi		2.30	4.60	9.20
Fail. Stress, psi		4.11	6.01	10.48
Strain, %		4.1	2.9	3.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0014R, S11
Sample Number: S36280   **Depth:** 11-12.3
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

DIRECT SHEAR TEST

1/16/2012

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019
Project No.: 11-111
Location: S0014R, S11
Depth: 11-12.3   **Sample Number:** S36280
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.100		2364.550
Moisture content: Dry soil+tare, gms.	2342.900		2342.900
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	13.8	14.8	14.8
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	136.9	138.3	
Dry density, pcf	120.3	120.5	
Void ratio	0.4007	0.3988	
Saturation, %	92.9	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.8676 lbs. per input unit
Normal stress = 2.3 psi
Strain rate, in./min. = 0.03
Fail. Stress = 4.11 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.700	8.8	0.2	1.89	0.3005
2	0.0100	5.600	10.5	0.4	2.26	0.3010
3	0.0200	6.700	12.5	0.8	2.70	0.3019
4	0.0300	7.900	14.8	1.2	3.18	0.3032
5	0.0420	9.000	16.8	1.7	3.62	0.3060
6	0.0500	9.400	17.6	2.1	3.79	0.3079
7	0.0630	10.000	18.7	2.6	4.03	0.3101
8	0.0750	10.000	18.7	3.1	4.03	0.3122
9	0.0850	10.100	18.9	3.5	4.07	0.3138
10	0.0900	10.100	18.9	3.7	4.07	0.3144
11	0.1000	10.200	19.0	4.1	4.11	0.3160

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1150	9.700	18.1	4.7	3.91	0.3179
13	0.1200	9.100	17.0	4.9	3.66	0.3180
14	0.1300	9.300	17.4	5.3	3.75	0.3189
15	0.1400	9.200	17.2	5.8	3.70	0.3200
16	0.1500	8.000	14.9	6.2	3.22	0.3208

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.100		2363.850
Moisture content: Dry soil+tare, gms.	2342.800		2342.800
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	13.9	14.4	14.4
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	136.9	138.8	
Dry density, pcf	120.3	121.4	
Void ratio	0.4016	0.3887	
Saturation, %	93.2	99.9	

Load ring constant = .8988 lbs. per input unit

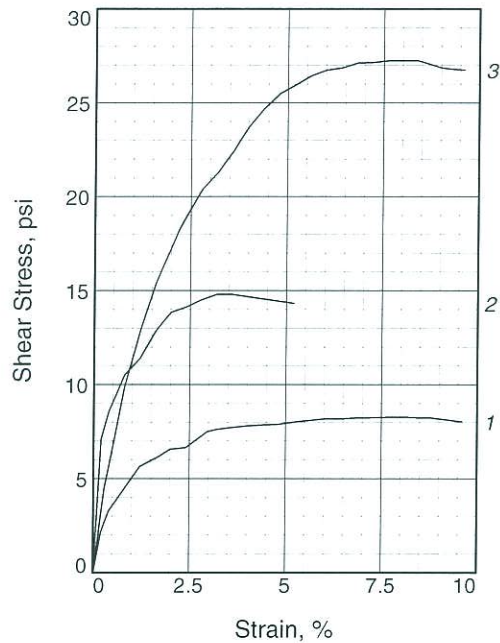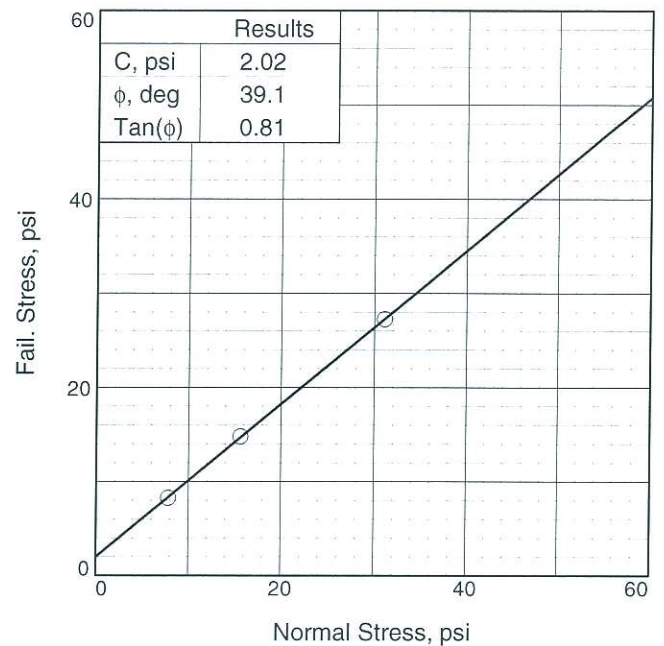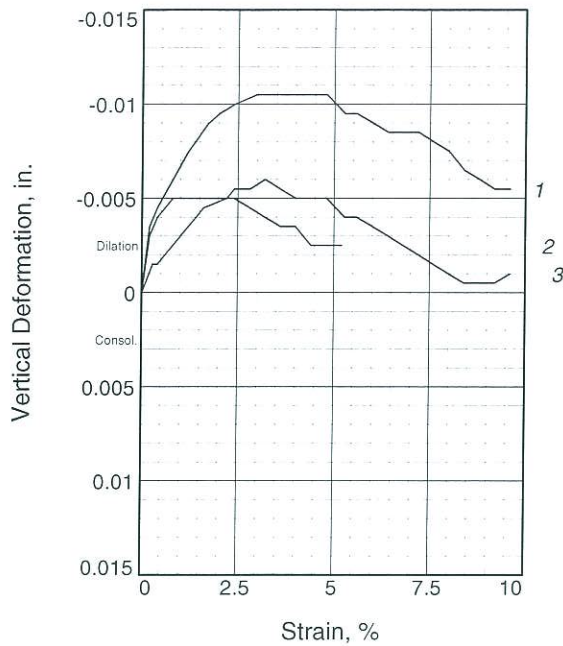Normal stress = 4.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 6.01 psi at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.100	6.4	0.2	1.38	0.3000
2	0.0100	12.600	11.3	0.4	2.44	0.3001
3	0.0240	19.600	17.6	1.0	3.80	0.3002
4	0.0300	22.700	20.4	1.2	4.40	0.3011
5	0.0400	25.600	23.0	1.6	4.96	0.3029
6	0.0500	28.000	25.2	2.1	5.43	0.3041
7	0.0620	30.600	27.5	2.6	5.93	0.3070
8	0.0700	31.000	27.9	2.9	6.01	0.3083
9	0.0800	30.600	27.5	3.3	5.93	0.3112
10	0.0900	30.100	27.1	3.7	5.83	0.3134
11	0.1000	29.700	26.7	4.1	5.76	0.3148
12	0.1100	28.800	25.9	4.5	5.58	0.3160

Sierra Testing Labs, Inc.

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2380.150
Moisture content: Dry soil+tare, gms.	2359.200		2359.200
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	13.7	14.3	14.3
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	136.9	139.0	
Dry density, pcf	120.4	121.6	
Void ratio	0.3997	0.3864	
Saturation, %	92.6	99.9	

Load ring constant = .8988 lbs. per input unit

Normal stress = 9.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 10.48 psi at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	12.000	10.8	0.2	2.33	0.2990
2	0.0120	22.100	19.9	0.5	4.28	0.2985
3	0.0200	29.600	26.6	0.8	5.74	0.2984
4	0.0320	40.000	36.0	1.3	7.75	0.2997
5	0.0410	44.800	40.3	1.7	8.68	0.3008
6	0.0540	50.800	45.7	2.2	9.85	0.3040
7	0.0600	51.800	46.6	2.5	10.04	0.3058
8	0.0710	53.600	48.2	2.9	10.39	0.3067
9	0.0800	54.100	48.6	3.3	10.48	0.3098
10	0.0900	53.000	47.6	3.7	10.27	0.3114
11	0.1050	50.000	44.9	4.3	9.69	0.3132
12	0.1100	48.900	44.0	4.5	9.48	0.3140

Results	
C, psi	0.19
φ, deg	31.2
Tan(φ)	0.60

Vertical Deformation, in. vs Strain, %

Dilation
Consol.

Fail. Stress, psi vs Normal Stress, psi

Shear Stress, psi vs Strain, %
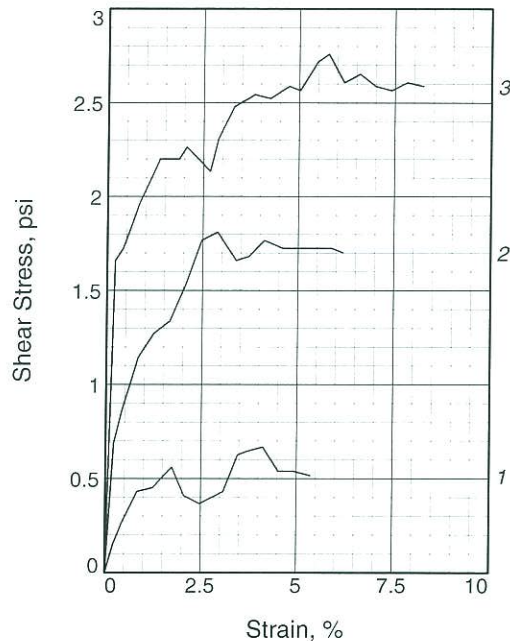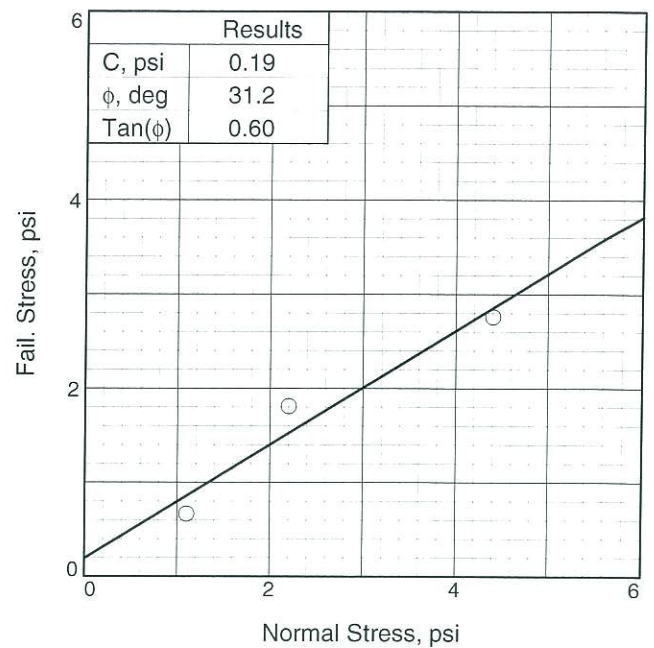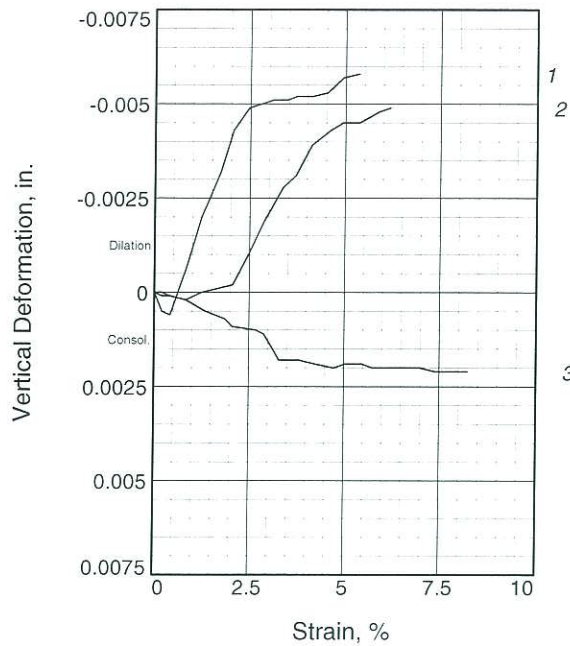
Sample No.		1	2	3
Initial	Water Content, %	16.2	16.1	16.4
	Dry Density, pcf	89.5	89.5	89.3
	Saturation, %	49.3	49.1	49.8
	Void Ratio	0.8843	0.8825	0.8877
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	32.7	32.6	32.6
	Dry Density, pcf	89.5	89.7	89.6
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.8839	0.8793	0.8804
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
Normal Stress, psi		1.10	2.20	4.40
Fail. Stress, psi		0.67	1.81	2.76
Strain, %		4.1	2.9	5.8
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0015R, S02
Sample Number: S36287   **Depth:** 5-6.5
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0015R, S02

Depth: 5-6.5   **Sample Number:**   S36287

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2322.900		2340.900
Moisture content: Dry soil+tare, gms.	2305.300		2305.300
Moisture content: Tare, gms.	2196.400		2196.400
Moisture, %	16.2	32.7	32.7
Moist specimen weight, gms.	126.5		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	103.9	118.7	
Dry density, pcf	89.5	89.5	
Void ratio	0.8843	0.8839	
Saturation, %	49.3	99.9	

Test Readings for Specimen No. 1

Normal stress = 1.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 0.67 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	0.700	0.7	0.2	0.15	0.2995
2	0.0100	1.200	1.2	0.4	0.26	0.2994
3	0.0200	2.000	2.0	0.8	0.43	0.3006
4	0.0300	2.100	2.1	1.2	0.45	0.3020
5	0.0420	2.600	2.6	1.7	0.56	0.3032
6	0.0500	1.900	1.9	2.1	0.41	0.3043
7	0.0600	1.700	1.7	2.5	0.37	0.3049
8	0.0750	2.000	2.0	3.1	0.43	0.3051
9	0.0840	2.900	2.9	3.5	0.63	0.3051
10	0.0900	3.000	3.0	3.7	0.65	0.3052
11	0.1000	3.100	3.1	4.1	0.67	0.3052
12	0.1100	2.500	2.5	4.5	0.54	0.3053

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	2.500	2.5	4.9	0.54	0.3057
14	0.1300	2.400	2.4	5.3	0.52	0.3058

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2338.700		2356.700
Moisture content: Dry soil+tare, gms.	2321.200		2321.200
Moisture content: Tare, gms.	2212.200		2212.200
Moisture, %	16.1	32.6	32.6
Moist specimen weight, gms.	126.5		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	103.9	118.9	
Dry density, pcf	89.5	89.7	
Void ratio	0.8825	0.8793	
Saturation, %	49.1	100.0	

Normal stress = 2.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.81 psi at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	3.200	3.2	0.2	0.69	0.3000
2	0.0100	4.000	4.0	0.4	0.86	0.2999
3	0.0200	5.300	5.3	0.8	1.14	0.2998
4	0.0300	5.900	5.9	1.2	1.27	0.3000
5	0.0400	6.200	6.2	1.6	1.34	0.3001
6	0.0500	7.100	7.1	2.1	1.53	0.3002
7	0.0600	8.200	8.2	2.5	1.77	0.3010
8	0.0700	8.400	8.4	2.9	1.81	0.3019
9	0.0820	7.700	7.7	3.4	1.66	0.3028
10	0.0900	7.800	7.8	3.7	1.68	0.3031
11	0.1000	8.200	8.2	4.1	1.77	0.3039
12	0.1120	8.000	8.0	4.6	1.72	0.3043
13	0.1200	8.000	8.0	4.9	1.72	0.3045
14	0.1300	8.000	8.0	5.3	1.72	0.3045
15	0.1430	8.000	8.0	5.9	1.72	0.3048
16	0.1500	7.900	7.9	6.2	1.70	0.3049

Sierra Testing Labs, Inc.

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2323.300		2340.900
Moisture content: Dry soil+tare, gms.	2305.500		2305.500
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	16.4	32.6	32.6
Moist specimen weight, gms.	126.5		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	103.9	118.8	
Dry density, pcf	89.3	89.6	
Void ratio	0.8877	0.8804	
Saturation, %	49.8	99.9	

Normal stress = 4.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.76 psi at reading no. 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.700	7.7	0.2	1.66	0.2999
2	0.0100	8.000	8.0	0.4	1.72	0.2999
3	0.0200	9.100	9.1	0.8	1.96	0.2998
4	0.0330	10.200	10.2	1.4	2.20	0.2995
5	0.0450	10.200	10.2	1.9	2.20	0.2993
6	0.0500	10.500	10.5	2.1	2.26	0.2991
7	0.0650	9.900	9.9	2.7	2.13	0.2990
8	0.0700	10.700	10.7	2.9	2.31	0.2989
9	0.0800	11.500	11.5	3.3	2.48	0.2982
10	0.0930	11.800	11.8	3.8	2.54	0.2982
11	0.1030	11.700	11.7	4.2	2.52	0.2981
12	0.1150	12.000	12.0	4.7	2.59	0.2980
13	0.1220	11.900	11.9	5.0	2.57	0.2981
14	0.1330	12.600	12.6	5.5	2.72	0.2981
15	0.1400	12.800	12.8	5.8	2.76	0.2980
16	0.1500	12.100	12.1	6.2	2.61	0.2980
17	0.1600	12.300	12.3	6.6	2.65	0.2980
18	0.1700	12.000	12.0	7.0	2.59	0.2980
19	0.1800	11.900	11.9	7.4	2.57	0.2979
20	0.1900	12.100	12.1	7.8	2.61	0.2979
21	0.2000	12.000	12.0	8.2	2.59	0.2979

Results	
C, psi	0.84
φ, deg	40.8
Tan(φ)	0.86

Vertical Deformation, in. / Strain, %

Fail. Stress, psi / Normal Stress, psi

Shear Stress, psi / Strain, %

Sample No.		1	2	3
Initial	Water Content, %	17.5	17.6	17.6
	Dry Density, pcf	113.9	113.9	113.9
	Saturation, %	98.7	98.9	98.9
	Void Ratio	0.4794	0.4805	0.4805
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	16.7	16.0	16.1
	Dry Density, pcf	116.1	117.6	117.5
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.4513	0.4331	0.4343
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.97	0.97
Normal Stress, psi		4.50	9.00	18.10
Fail. Stress, psi		4.55	8.88	16.39
Strain, %		3.3	4.5	5.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0015R, S09A
Sample Number: S36289   **Depth:** 20-20.3
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

DIRECT SHEAR TEST

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019
Project No.: 11-111
Location: S0015R, S09A
Depth: 20-20.3   **Sample Number:** S36289
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2359.700		2358.550
Moisture content: Dry soil+tare, gms.	2335.400		2335.400
Moisture content: Tare, gms.	2196.700		2196.700
Moisture, %	17.5	16.7	16.7
Moist specimen weight, gms.	163.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	133.9	135.5	
Dry density, pcf	113.9	116.1	
Void ratio	0.4794	0.4513	
Saturation, %	98.7	99.9	

Test Readings for Specimen No. 1

Normal stress = 4.5 psi
Strain rate, in./min. = 0.03
Fail. Stress = 4.55 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.000	5.0	0.2	1.08	0.2994
2	0.0100	7.000	7.0	0.4	1.51	0.2992
3	0.0200	10.100	10.1	0.8	2.18	0.2993
4	0.0300	13.700	13.7	1.2	2.95	0.2998
5	0.0400	16.000	16.0	1.6	3.45	0.3003
6	0.0500	18.000	18.0	2.1	3.88	0.3018
7	0.0600	19.200	19.2	2.5	4.14	0.3021
8	0.0700	20.600	20.6	2.9	4.44	0.3038
9	0.0800	21.100	21.1	3.3	4.55	0.3046
10	0.0900	20.200	20.2	3.7	4.36	0.3061
11	0.1000	19.600	19.6	4.1	4.23	0.3070
12	0.1100	18.500	18.5	4.5	3.99	0.3075

Sierra Testing Labs, Inc.

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2375.600		2373.400
Moisture content: Dry soil+tare, gms.	2351.200		2351.200
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	17.6	16.0	16.0
Moist specimen weight, gms.	163.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	133.9	136.5	
Dry density, pcf	113.9	117.6	
Void ratio	0.4805	0.4331	
Saturation, %	98.9	99.9	

Normal stress = 9.0 psi

Strain rate, in./min. = 0.03

Fail. Stress = 8.88 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.600	7.6	0.2	1.64	0.2998
2	0.0100	10.800	10.8	0.4	2.33	0.2991
3	0.0200	13.600	13.6	0.8	2.93	0.2984
4	0.0300	20.100	20.1	1.2	4.33	0.2975
5	0.0400	25.500	25.5	1.6	5.50	0.2970
6	0.0500	30.000	30.0	2.1	6.47	0.2971
7	0.0600	33.300	33.3	2.5	7.18	0.2972
8	0.0700	34.900	34.9	2.9	7.53	0.2977
9	0.0800	37.100	37.1	3.3	8.00	0.2981
10	0.0910	38.500	38.5	3.7	8.30	0.2988
11	0.1000	40.000	40.0	4.1	8.62	0.2991
12	0.1100	41.200	41.2	4.5	8.88	0.2999
13	0.1220	41.100	41.1	5.0	8.86	0.3003
14	0.1300	41.100	41.1	5.3	8.86	0.3008
15	0.1400	40.700	40.7	5.8	8.78	0.3011
16	0.1500	40.000	40.0	6.2	8.62	0.3015
17	0.1600	38.100	38.1	6.6	8.22	0.3018

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2359.800		2357.700
Moisture content: Dry soil+tare, gms.	2335.400		2335.400
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	17.6	16.1	16.1
Moist specimen weight, gms.	163.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	133.9	136.4	
Dry density, pcf	113.9	117.5	
Void ratio	0.4805	0.4343	
Saturation, %	98.9	100.0	

Normal stress = 18.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 16.39 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	15.600	15.6	0.2	3.36	0.2988
2	0.0120	24.500	24.5	0.5	5.28	0.2979
3	0.0200	30.200	30.2	0.8	6.51	0.2970
4	0.0300	40.000	40.0	1.2	8.62	0.2961
5	0.0400	47.100	47.1	1.6	10.16	0.2960
6	0.0520	55.000	55.0	2.1	11.86	0.2960
7	0.0600	59.200	59.2	2.5	12.76	0.2960
8	0.0700	65.000	65.0	2.9	14.02	0.2961
9	0.0830	70.100	70.1	3.4	15.12	0.2968
10	0.0950	73.000	73.0	3.9	15.74	0.2972
11	0.1000	73.500	73.5	4.1	15.85	0.2977
12	0.1100	75.700	75.7	4.5	16.32	0.2981
13	0.1220	75.800	75.8	5.0	16.34	0.2989
14	0.1300	76.000	76.0	5.3	16.39	0.2991
15	0.1400	71.000	71.0	5.8	15.31	0.2992
16	0.1500	69.200	69.2	6.2	14.92	0.2994
17	0.1600	68.400	68.4	6.6	14.75	0.2995

Results	
C, psi	0.89
φ, deg	36.7
Tan(φ)	0.75

Vertical Deformation, in. / Strain, %

Dilation

Consol.

Fail. Stress, psi / Normal Stress, psi

Shear Stress, psi / Strain, %
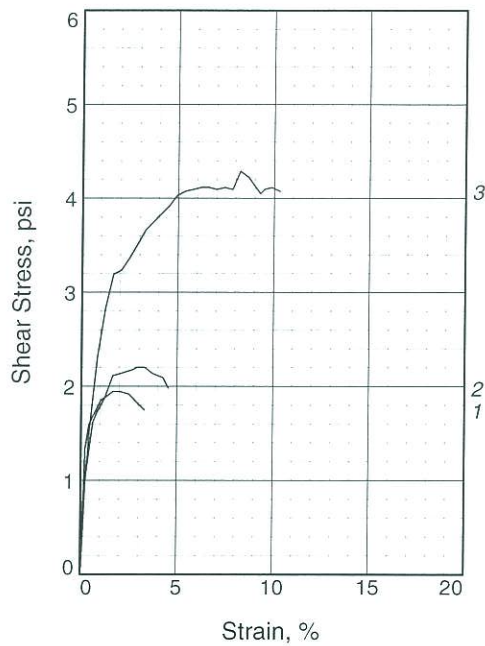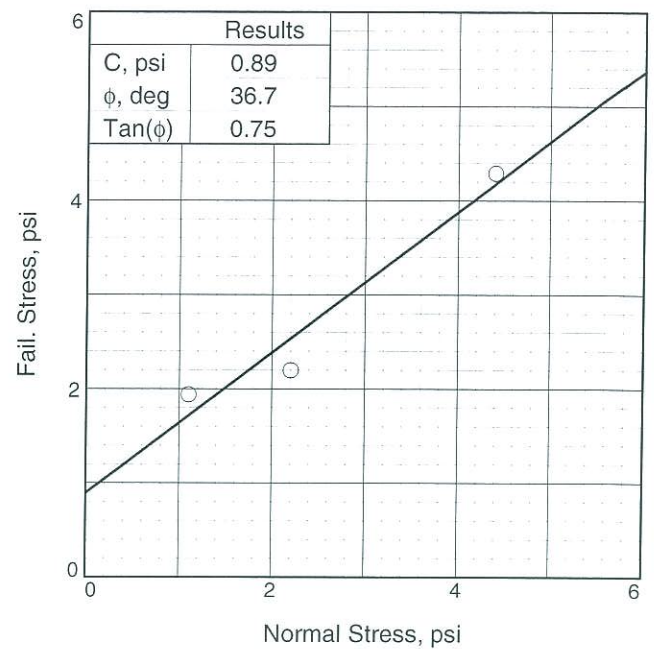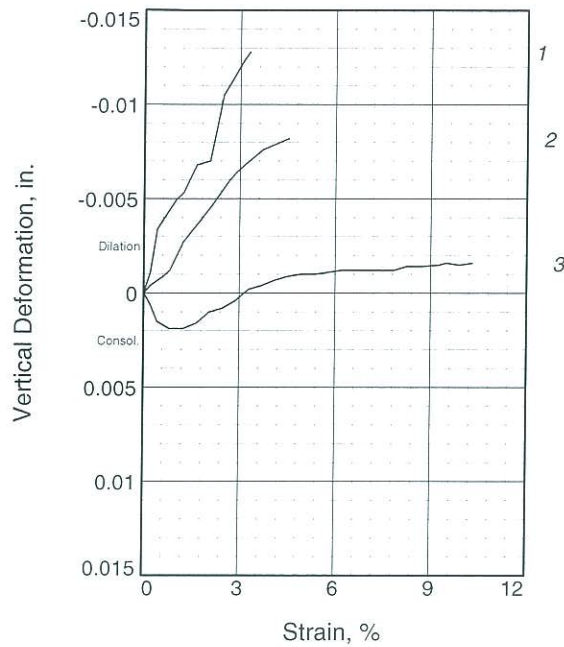
Sample No.		1	2	3
Initial	Water Content, %	12.4	12.4	12.6
	Dry Density, pcf	106.7	106.7	106.5
	Saturation, %	57.7	57.7	58.3
	Void Ratio	0.5796	0.5796	0.5821
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	21.2	20.9	21.1
	Dry Density, pcf	107.2	107.8	107.4
	Saturation, %	99.9	100.0	100.0
	Void Ratio	0.5719	0.5635	0.5693
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
Normal Stress, psi		1.10	2.20	4.40
Fail. Stress, psi		1.94	2.20	4.29
Strain, %		1.6	2.9	8.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0016R, S02
Sample Number: S36293   **Depth:** 5-6.0
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0016R, S02

Depth: 5-6.0   **Sample Number:** S36293

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2358.600		2370.000
Moisture content: Dry soil+tare, gms.	2342.500		2342.500
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	12.4	21.2	21.2
Moist specimen weight, gms.	146.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	119.9	129.9	
Dry density, pcf	106.7	107.2	
Void ratio	0.5796	0.5719	
Saturation, %	57.7	99.9	

Normal stress = 1.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.94 psi **at reading no.** 5

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	6.200	6.2	0.2	1.34	0.3011
2	0.0100	7.400	7.4	0.4	1.60	0.3034
3	0.0250	8.600	8.6	1.0	1.85	0.3050
4	0.0300	8.700	8.7	1.2	1.88	0.3053
5	0.0400	9.000	9.0	1.6	1.94	0.3068
6	0.0500	9.000	9.0	2.1	1.94	0.3070
7	0.0600	8.900	8.9	2.5	1.92	0.3105
8	0.0750	8.300	8.3	3.1	1.79	0.3123
9	0.0800	8.100	8.1	3.3	1.75	0.3128

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2342.600		2353.600
Moisture content: Dry soil+tare, gms.	2326.500		2326.500
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	12.4	20.9	20.9
Moist specimen weight, gms.	146.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	119.9	130.3	
Dry density, pcf	106.7	107.8	
Void ratio	0.5796	0.5635	
Saturation, %	57.7	100.0	

Normal stress = 2.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.20 psi at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.600	4.6	0.2	0.99	0.3004
2	0.0150	7.500	7.5	0.6	1.62	0.3009
3	0.0200	8.000	8.0	0.8	1.72	0.3012
4	0.0300	8.700	8.7	1.2	1.88	0.3027
5	0.0400	9.800	9.8	1.6	2.11	0.3036
6	0.0500	9.900	9.9	2.1	2.13	0.3045
7	0.0650	10.100	10.1	2.7	2.18	0.3060
8	0.0700	10.200	10.2	2.9	2.20	0.3064
9	0.0800	10.200	10.2	3.3	2.20	0.3070
10	0.0900	9.900	9.9	3.7	2.13	0.3076
11	0.1030	9.700	9.7	4.2	2.09	0.3080
12	0.1100	9.200	9.2	4.5	1.98	0.3082

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2358.800		2369.850
Moisture content: Dry soil+tare, gms.	2342.500		2342.500
Moisture content: Tare, gms.	2212.800		2212.800
Moisture, %	12.6	21.1	21.1
Moist specimen weight, gms.	146.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	119.9	130.1	
Dry density, pcf	106.5	107.4	
Void ratio	0.5821	0.5693	
Saturation, %	58.3	100.0	

Normal stress = 4.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 4.29 psi at reading no. 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.400	4.4	0.2	0.95	0.2994
2	0.0100	6.900	6.9	0.4	1.49	0.2985
3	0.0200	10.700	10.7	0.8	2.31	0.2981
4	0.0300	13.100	13.1	1.2	2.82	0.2981
5	0.0400	14.800	14.8	1.6	3.19	0.2984
6	0.0500	15.000	15.0	2.1	3.23	0.2990
7	0.0600	15.600	15.6	2.5	3.36	0.2992
8	0.0700	16.300	16.3	2.9	3.51	0.2996
9	0.0800	17.000	17.0	3.3	3.67	0.3002
10	0.0900	17.400	17.4	3.7	3.75	0.3004
11	0.1000	17.800	17.8	4.1	3.84	0.3007
12	0.1100	18.200	18.2	4.5	3.92	0.3009
13	0.1200	18.700	18.7	4.9	4.03	0.3010
14	0.1300	18.900	18.9	5.3	4.08	0.3010
15	0.1400	19.000	19.0	5.8	4.10	0.3011
16	0.1500	19.100	19.1	6.2	4.12	0.3012
17	0.1600	19.100	19.1	6.6	4.12	0.3012
18	0.1700	19.000	19.0	7.0	4.10	0.3012
19	0.1800	19.100	19.1	7.4	4.12	0.3012
20	0.1900	19.000	19.0	7.8	4.10	0.3012
21	0.2000	19.900	19.9	8.2	4.29	0.3014
22	0.2100	19.600	19.6	8.6	4.23	0.3014
23	0.2250	18.800	18.8	9.3	4.05	0.3015
24	0.2300	19.000	19.0	9.5	4.10	0.3016
25	0.2400	19.100	19.1	9.9	4.12	0.3015
26	0.2500	18.900	18.9	10.3	4.08	0.3016

Vertical Deformation vs Strain chart (top left):
- Y-axis: Vertical Deformation, in. (-0.015 to 0.015)
- X-axis: Strain, % (0 to 8)
- Labels: Dilation, Consol.
- Curves labeled 2, 1, 3

Fail. Stress vs Normal Stress chart (top right):
- Y-axis: Fail. Stress, psi (0 to 60)
- X-axis: Normal Stress, psi (0 to 60)

Results	
C, psi	2.50
φ, deg	42.0
Tan(φ)	0.90

Shear Stress vs Strain chart (bottom left):
- Y-axis: Shear Stress, psi (0 to 60)
- X-axis: Strain, % (0 to 10)
- Curves labeled 3, 2, 1

Sample No.		1	2	3
Initial	Water Content, %	16.9	16.7	16.7
	Dry Density, pcf	109.4	109.6	109.6
	Saturation, %	84.3	83.9	83.9
	Void Ratio	0.5401	0.5382	0.5382
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.2	18.6	18.7
	Dry Density, pcf	110.9	112.2	111.9
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.5198	0.5027	0.5059
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.98	0.98
Normal Stress, psi		8.50	17.10	34.20
Fail. Stress, psi		9.29	19.19	32.86
Strain, %		4.3	5.1	4.9
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0016R, S08
Sample Number: S36294   **Depth:** 35-35.9
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                         Fresno to Bakersfield Geotech Investigation
                         #SA-HST019
Project No.:   11-111
Location: S0016R, S08
Depth: 35-35.9   **Sample Number:**   S36294
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2367.980		2371.150
Moisture content: Dry soil+tare, gms.	2345.500		2345.500
Moisture content: Tare, gms.	2212.200		2212.200
Moisture, %	16.9	19.2	19.2
Moist specimen weight, gms.	155.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	127.9	132.2	
Dry density, pcf	109.4	110.9	
Void ratio	0.5401	0.5198	
Saturation, %	84.3	99.9	

Test Readings for Specimen No. 1

Normal stress = 8.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 9.29 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.100	7.1	0.2	1.53	0.2999
2	0.0100	10.200	10.2	0.4	2.20	0.2998
3	0.0240	17.800	17.8	1.0	3.84	0.2990
4	0.0300	20.600	20.6	1.2	4.44	0.2991
5	0.0400	23.800	23.8	1.6	5.13	0.2993
6	0.0500	28.800	28.8	2.1	6.21	0.3000
7	0.0660	34.900	34.9	2.7	7.53	0.3014
8	0.0700	37.900	37.9	2.9	8.17	0.3024
9	0.0860	41.100	41.1	3.5	8.86	0.3040
10	0.0900	42.000	42.0	3.7	9.06	0.3042
11	0.1050	43.100	43.1	4.3	9.29	0.3062
12	0.1120	43.000	43.0	4.6	9.27	0.3070

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	42.200	42.2	4.9	9.10	0.3080
14	0.1300	41.400	41.4	5.3	8.93	0.3097
15	0.1400	39.800	39.8	5.8	8.58	0.3102

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2352.500		2355.000
Moisture content: Dry soil+tare, gms.	2330.200		2330.200
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	16.7	18.6	18.6
Moist specimen weight, gms.	155.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	127.9	133.0	
Dry density, pcf	109.6	112.2	
Void ratio	0.5382	0.5027	
Saturation, %	83.9	99.9	

Normal stress = 17.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 19.19 psi at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0060	14.600	14.6	0.2	3.15	0.2997
2	0.0100	18.900	18.9	0.4	4.08	0.2995
3	0.0200	22.700	22.7	0.8	4.89	0.2989
4	0.0310	33.500	33.5	1.3	7.22	0.2988
5	0.0420	45.600	45.6	1.7	9.83	0.2981
6	0.0500	53.000	53.0	2.1	11.43	0.2981
7	0.0600	62.100	62.1	2.5	13.39	0.2988
8	0.0720	70.900	70.9	3.0	15.29	0.2999
9	0.0820	76.800	76.8	3.4	16.56	0.3010
10	0.0900	80.800	80.8	3.7	17.42	0.3019
11	0.1000	85.000	85.0	4.1	18.33	0.3031
12	0.1100	88.200	88.2	4.5	19.02	0.3050
13	0.1250	89.000	89.0	5.1	19.19	0.3069
14	0.1350	88.000	88.0	5.6	18.97	0.3082
15	0.1420	87.000	87.0	5.8	18.76	0.3091
16	0.1500	85.200	85.2	6.2	18.37	0.3100
17	0.1600	82.900	82.9	6.6	17.88	0.3113

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2352.500		2355.200
Moisture content: Dry soil+tare, gms.	2330.200		2330.200
Moisture content: Tare, gms.	2196.780		2196.800
Moisture, %	16.7	18.7	18.7
Moist specimen weight, gms.	155.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	127.9	132.9	
Dry density, pcf	109.6	111.9	
Void ratio	0.5382	0.5059	
Saturation, %	83.9	100.0	

Normal stress = 34.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 32.86 psi at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	19.200	19.2	0.2	4.14	0.2997
2	0.0100	34.900	34.9	0.4	7.53	0.2991
3	0.0200	58.500	58.5	0.8	12.61	0.2983
4	0.0300	81.300	81.3	1.2	17.53	0.2980
5	0.0400	98.400	98.4	1.6	21.22	0.2981
6	0.0500	112.200	112.2	2.1	24.19	0.2989
7	0.0600	124.600	124.6	2.5	26.87	0.2995
8	0.0700	134.700	134.7	2.9	29.04	0.3005
9	0.0800	140.800	140.8	3.3	30.36	0.3016
10	0.0900	148.700	148.7	3.7	32.06	0.3029
11	0.1000	149.000	149.0	4.1	32.13	0.3040
12	0.1100	150.000	150.0	4.5	32.34	0.3041
13	0.1200	152.400	152.4	4.9	32.86	0.3065
14	0.1300	151.900	151.9	5.3	32.75	0.3077
15	0.1400	148.600	148.6	5.8	32.04	0.3088
16	0.1500	144.000	144.0	6.2	31.05	0.3093

Results

C, psi	2.17
φ, deg	32.2
Tan(φ)	0.63
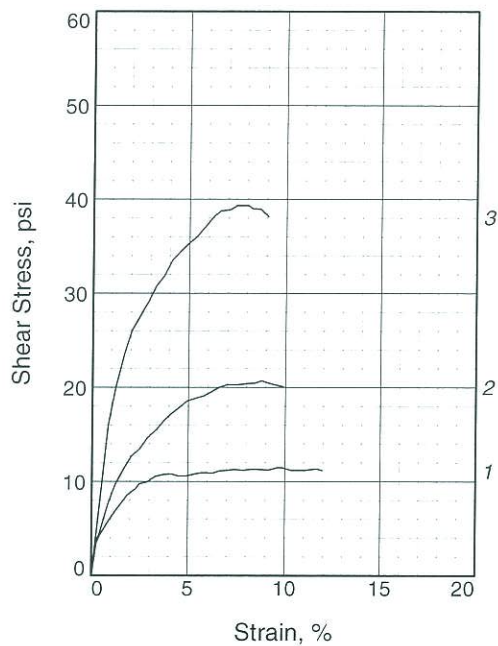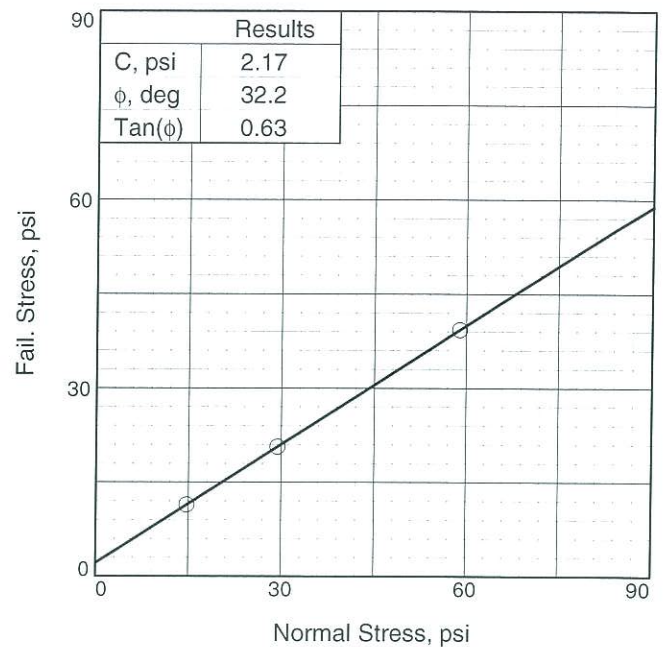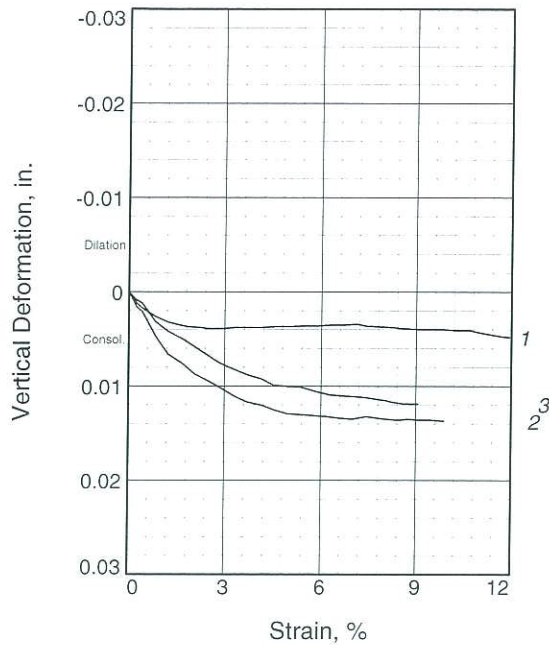
Sample No.		1	2	3
Initial	Water Content, %	14.4	14.5	14.5
	Dry Density, pcf	107.4	107.4	107.4
	Saturation, %	68.6	68.9	68.9
	Void Ratio	0.5688	0.5700	0.5700
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.1	17.3	15.4
	Dry Density, pcf	111.2	114.8	118.9
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5159	0.4679	0.4171
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.97	0.94	0.90
Normal Stress, psi		14.70	29.40	58.90
Fail. Stress, psi		11.45	20.70	39.32
Strain, %		9.6	8.8	7.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold

Description:

Specific Gravity= 2.70

Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Location: S0016R, S13

Sample Number: S36296   **Depth:** 60-61.5

Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                 Fresno to Bakersfield Geotech Investigation
                 #SA-HST019
Project No.:   11-111
Location: S0016R, S13
Depth: 60-61.5   **Sample Number:**   S36296
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2346.500		2352.600
Moisture content: Dry soil+tare, gms.	2327.600		2327.600
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	14.4	19.1	19.1
Moist specimen weight, gms.	149.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	123.0	132.4	
Dry density, pcf	107.4	111.2	
Void ratio	0.5688	0.5159	
Saturation, %	68.6	100.0	

Normal stress = 14.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 11.45 psi **at reading no.** 24

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0060	15.800	15.8	0.2	3.41	0.2988
2	0.0100	19.800	19.8	0.4	4.27	0.2983
3	0.0200	26.300	26.3	0.8	5.67	0.2974
4	0.0300	32.000	32.0	1.2	6.90	0.2968
5	0.0440	39.400	39.4	1.8	8.50	0.2963
6	0.0550	42.700	42.7	2.3	9.21	0.2962
7	0.0600	45.200	45.2	2.5	9.75	0.2961
8	0.0700	46.200	46.2	2.9	9.96	0.2961
9	0.0800	48.800	48.8	3.3	10.52	0.2962
10	0.0900	49.800	49.8	3.7	10.74	0.2962
11	0.1000	50.200	50.2	4.1	10.82	0.2962
12	0.1100	49.000	49.0	4.5	10.57	0.2963

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	49.200	49.2	4.9	10.61	0.2963
14	0.1300	50.100	50.1	5.3	10.80	0.2964
15	0.1400	50.700	50.7	5.8	10.93	0.2964
16	0.1520	50.500	50.5	6.3	10.89	0.2965
17	0.1600	51.500	51.5	6.6	11.10	0.2965
18	0.1730	52.000	52.0	7.1	11.21	0.2966
19	0.1800	52.400	52.4	7.4	11.30	0.2964
20	0.1900	51.800	51.8	7.8	11.17	0.2963
21	0.2020	52.500	52.5	8.3	11.32	0.2962
22	0.2100	52.400	52.4	8.6	11.30	0.2961
23	0.2220	52.000	52.0	9.1	11.21	0.2960
24	0.2330	53.100	53.1	9.6	11.45	0.2960
25	0.2400	53.100	53.1	9.9	11.45	0.2960
26	0.2500	52.000	52.0	10.3	11.21	0.2959
27	0.2600	51.900	51.9	10.7	11.19	0.2959
28	0.2700	52.000	52.0	11.1	11.21	0.2956
29	0.2830	52.600	52.6	11.6	11.34	0.2953
30	0.2900	51.800	51.8	11.9	11.17	0.2952

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2361.700		2365.350
Moisture content: Dry soil+tare, gms.	2342.700		2342.700
Moisture content: Tare, gms.	2212.000		2212.000
Moisture, %	14.5	17.3	17.3
Moist specimen weight, gms.	149.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.07	
Wet density, pcf	123.0	134.7	
Dry density, pcf	107.4	114.8	
Void ratio	0.5700	0.4679	
Saturation, %	68.9	100.0	

Normal stress = 29.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 20.70 psi at reading no. 22

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0060	16.800	16.8	0.2	3.62	0.2984
2	0.0100	21.000	21.0	0.4	4.53	0.2979
3	0.0200	35.000	35.0	0.8	7.55	0.2954
4	0.0300	45.200	45.2	1.2	9.75	0.2934
5	0.0400	52.700	52.7	1.6	11.36	0.2925
6	0.0500	58.800	58.8	2.1	12.68	0.2913
7	0.0600	62.400	62.4	2.5	13.45	0.2906
8	0.0700	68.000	68.0	2.9	14.66	0.2898
9	0.0810	71.900	71.9	3.3	15.50	0.2889
10	0.0900	76.200	76.2	3.7	16.43	0.2883
11	0.1000	79.800	79.8	4.1	17.21	0.2880
12	0.1100	82.900	82.9	4.5	17.88	0.2875
13	0.1200	86.100	86.1	4.9	18.57	0.2871
14	0.1300	87.400	87.4	5.3	18.85	0.2870
15	0.1400	88.500	88.5	5.8	19.08	0.2869
16	0.1500	90.600	90.6	6.2	19.54	0.2868
17	0.1600	92.900	92.9	6.6	20.03	0.2866
18	0.1700	94.200	94.2	7.0	20.31	0.2865
19	0.1800	94.100	94.1	7.4	20.29	0.2868
20	0.1950	94.600	94.6	8.0	20.40	0.2865
21	0.2050	94.900	94.9	8.4	20.46	0.2864
22	0.2130	96.000	96.0	8.8	20.70	0.2865
23	0.2200	95.100	95.1	9.1	20.51	0.2864
24	0.2300	94.000	94.0	9.5	20.27	0.2864
25	0.2400	93.300	93.3	9.9	20.12	0.2863

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2362.300		2363.480
Moisture content: Dry soil+tare, gms.	2343.300		2343.300
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	14.5	15.4	15.4
Moist specimen weight, gms.	149.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.90	
Net decrease in height, in.		0.10	
Wet density, pcf	123.0	137.3	
Dry density, pcf	107.4	118.9	
Void ratio	0.5700	0.4171	
Saturation, %	68.9	100.0	

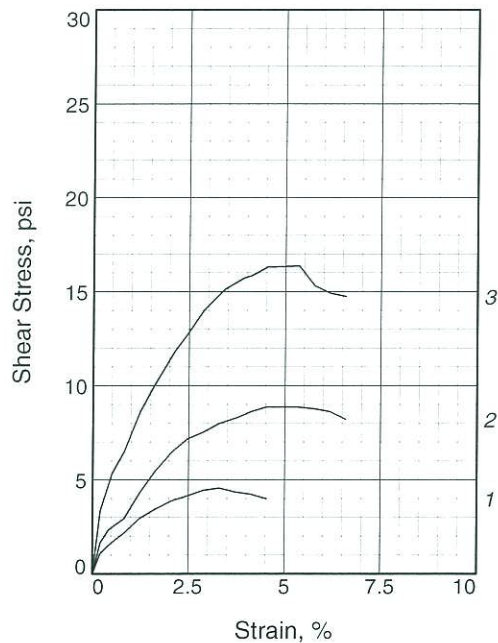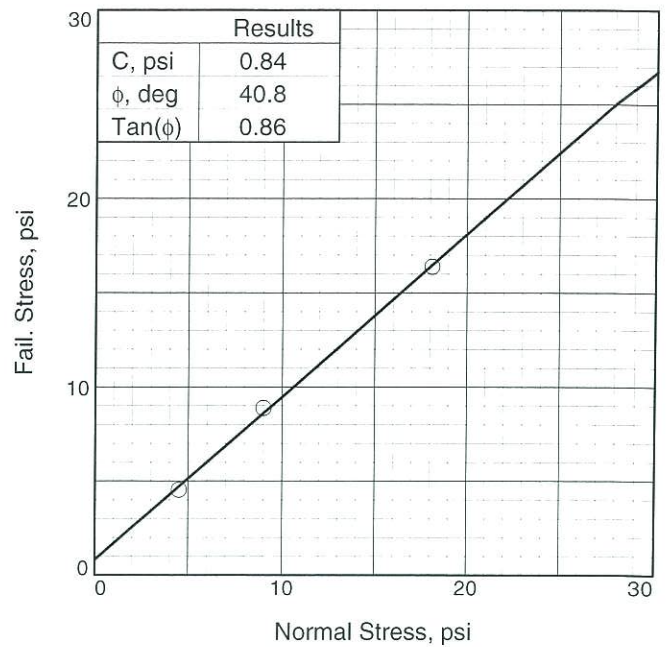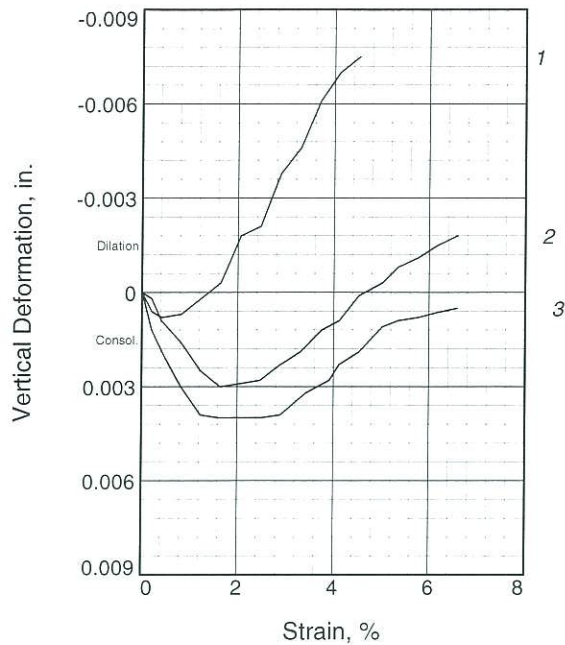Load ring constant = .8988 lbs. per input unit

Normal stress = 58.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 39.32 psi at reading no. 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	19.800	17.8	0.2	3.84	0.2992
2	0.0100	39.900	35.9	0.4	7.73	0.2988
3	0.0200	82.500	74.2	0.8	15.99	0.2969
4	0.0300	104.000	93.5	1.2	20.16	0.2958
5	0.0400	121.600	109.3	1.6	23.57	0.2951
6	0.0500	134.700	121.1	2.1	26.11	0.2942
7	0.0650	146.400	131.6	2.7	28.37	0.2928
8	0.0700	150.100	134.9	2.9	29.09	0.2924
9	0.0800	159.000	142.9	3.3	30.81	0.2918
10	0.0900	164.600	147.9	3.7	31.90	0.2912
11	0.1000	173.100	155.6	4.1	33.55	0.2908
12	0.1100	177.900	159.9	4.5	34.48	0.2901
13	0.1200	182.000	163.6	4.9	35.27	0.2900
14	0.1300	185.800	167.0	5.3	36.01	0.2899
15	0.1400	191.000	171.7	5.8	37.02	0.2895
16	0.1520	197.100	177.2	6.3	38.20	0.2891
17	0.1600	200.100	179.8	6.6	38.78	0.2890
18	0.1720	200.700	180.4	7.1	38.90	0.2889
19	0.1800	202.900	182.4	7.4	39.32	0.2888
20	0.1950	202.900	182.4	8.0	39.32	0.2885
21	0.2000	201.300	180.9	8.2	39.01	0.2883
22	0.2100	201.100	180.7	8.6	38.97	0.2881
23	0.2200	197.000	177.1	9.1	38.18	0.2881

Results	
C, psi	2.07
φ, deg	38.9
Tan(φ)	0.81
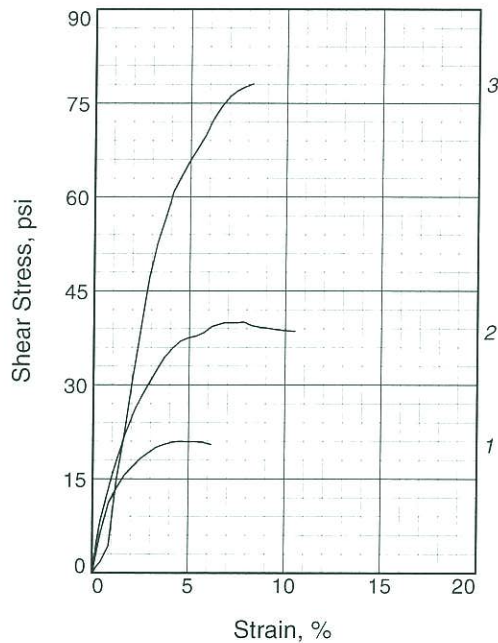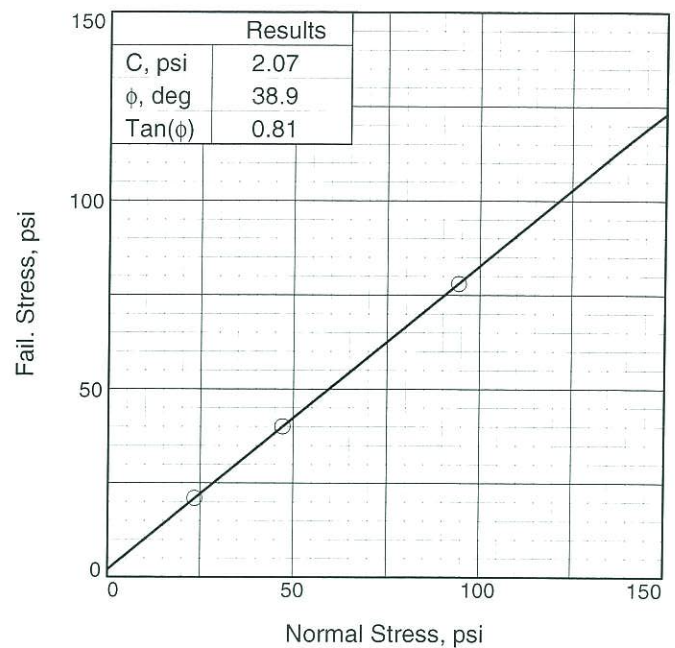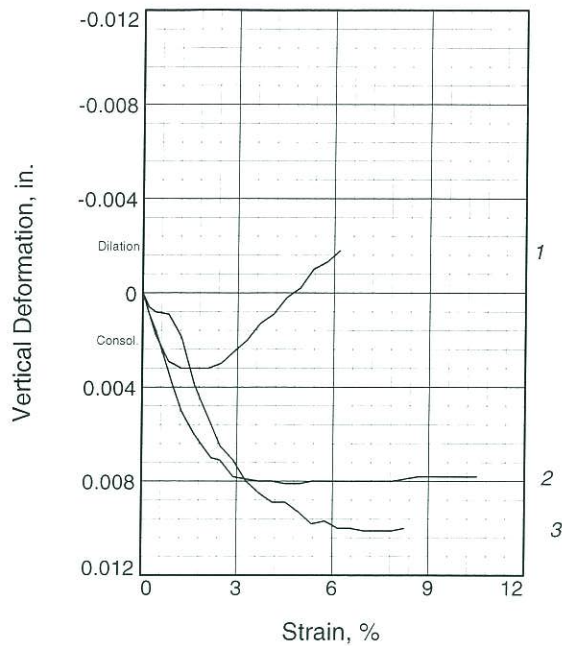
Sample No.		1	2	3
Initial	Water Content, %	15.3	15.1	15.0
	Dry Density, pcf	118.8	118.9	119.0
	Saturation, %	98.5	97.9	97.6
	Void Ratio	0.4191	0.4171	0.4161
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.0	12.3	12.1
	Dry Density, pcf	124.7	126.5	126.9
	Saturation, %	100.0	100.0	99.9
	Void Ratio	0.3519	0.3325	0.3283
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.95	0.94	0.94
Normal Stress, psi		23.50	47.10	94.20
Fail. Stress, psi		21.02	40.08	78.08
Strain, %		4.5	7.8	8.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0016R, S20
Sample Number: S36298   **Depth:** 95-96.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.: 11-111

Location: S0016R, S20

Depth: 95-96.5 **Sample Number:** S36298

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2376.050
Moisture content: Dry soil+tare, gms.	2357.200		2357.200
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	15.3	13.0	13.0
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	136.9	140.9	
Dry density, pcf	118.8	124.7	
Void ratio	0.4191	0.3519	
Saturation, %	98.5	100.0	

Test Readings for Specimen No. 1

Normal stress = 23.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 21.02 psi **at reading no.** 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	14.500	14.5	0.2	3.13	0.2991
2	0.0100	29.400	29.4	0.4	6.34	0.2982
3	0.0200	52.000	52.0	0.8	11.21	0.2971
4	0.0300	62.800	62.8	1.2	13.54	0.2968
5	0.0400	72.500	72.5	1.6	15.63	0.2968
6	0.0500	78.600	78.6	2.1	16.95	0.2968
7	0.0600	84.600	84.6	2.5	18.24	0.2970
8	0.0700	88.900	88.9	2.9	19.17	0.2975
9	0.0800	93.000	93.0	3.3	20.05	0.2980
10	0.0900	95.200	95.2	3.7	20.53	0.2987
11	0.1000	96.800	96.8	4.1	20.87	0.2991
12	0.1100	97.500	97.5	4.5	21.02	0.2998

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	97.000	97.0	4.9	20.92	0.3002
14	0.1300	97.200	97.2	5.3	20.96	0.3010
15	0.1400	96.400	96.4	5.8	20.79	0.3013
16	0.1500	95.200	95.2	6.2	20.53	0.3018

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.000		2358.940
Moisture content: Dry soil+tare, gms.	2341.100		2341.100
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	15.1	12.3	12.3
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	142.1	
Dry density, pcf	118.9	126.5	
Void ratio	0.4171	0.3325	
Saturation, %	97.9	100.0	

Normal stress = 47.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 40.08 psi at reading no. 20

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	22.500	22.5	0.2	4.85	0.2991
2	0.0100	38.900	38.9	0.4	8.39	0.2984
3	0.0230	69.500	69.5	0.9	14.99	0.2961
4	0.0300	83.200	83.2	1.2	17.94	0.2950
5	0.0400	102.000	102.0	1.6	21.99	0.2940
6	0.0530	121.700	121.7	2.2	26.24	0.2930
7	0.0600	129.500	129.5	2.5	27.92	0.2929
8	0.0700	140.100	140.1	2.9	30.21	0.2922
9	0.0800	150.000	150.0	3.3	32.34	0.2921
10	0.0900	159.800	159.8	3.7	34.46	0.2920
11	0.1000	166.400	166.4	4.1	35.88	0.2920
12	0.1100	171.500	171.5	4.5	36.98	0.2919
13	0.1200	173.900	173.9	4.9	37.50	0.2919
14	0.1300	175.300	175.3	5.3	37.80	0.2920
15	0.1400	178.000	178.0	5.8	38.38	0.2920
16	0.1500	182.400	182.4	6.2	39.33	0.2920
17	0.1650	185.000	185.0	6.8	39.89	0.2920
18	0.1700	185.000	185.0	7.0	39.89	0.2920
19	0.1800	185.100	185.1	7.4	39.91	0.2920
20	0.1900	185.900	185.9	7.8	40.08	0.2920

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
21	0.2000	183.100	183.1	8.2	39.48	0.2921
22	0.2100	181.900	181.9	8.6	39.22	0.2922
23	0.2200	181.200	181.2	9.1	39.07	0.2922
24	0.2300	180.400	180.4	9.5	38.90	0.2922
25	0.2400	179.700	179.7	9.9	38.75	0.2922
26	0.2550	179.000	179.0	10.5	38.60	0.2922

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2359.100
Moisture content: Dry soil+tare, gms.	2341.500		2341.500
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	15.0	12.1	12.1
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	142.3	
Dry density, pcf	119.0	126.9	
Void ratio	0.4161	0.3283	
Saturation, %	97.6	99.9	

Normal stress = 94.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 78.08 psi **at reading no.** 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.700	4.7	0.2	1.01	0.2994
2	0.0100	8.000	8.0	0.4	1.72	0.2992
3	0.0200	20.000	20.0	0.8	4.31	0.2991
4	0.0300	69.800	69.8	1.2	15.05	0.2981
5	0.0400	105.200	105.2	1.6	22.68	0.2961
6	0.0500	145.000	145.0	2.1	31.27	0.2948
7	0.0600	182.100	182.1	2.5	39.27	0.2935
8	0.0700	219.200	219.2	2.9	47.26	0.2929
9	0.0800	243.900	243.9	3.3	52.59	0.2920
10	0.0900	262.800	262.8	3.7	56.67	0.2915
11	0.1000	282.500	282.5	4.1	60.91	0.2911
12	0.1100	293.800	293.8	4.5	63.35	0.2911
13	0.1200	304.500	304.5	4.9	65.66	0.2907
14	0.1300	314.000	314.0	5.3	67.71	0.2902
15	0.1400	323.800	323.8	5.8	69.82	0.2903
16	0.1500	336.000	336.0	6.2	72.45	0.2900
17	0.1600	345.100	345.1	6.6	74.41	0.2900
18	0.1700	352.400	352.4	7.0	75.99	0.2899

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
19	0.1800	357.000	357.0	7.4	76.98	0.2899
20	0.1900	360.000	360.0	7.8	77.62	0.2899
21	0.2000	362.100	362.1	8.2	78.08	0.2900

Results	
C, psi	5.87
φ, deg	36.9
Tan(φ)	0.75
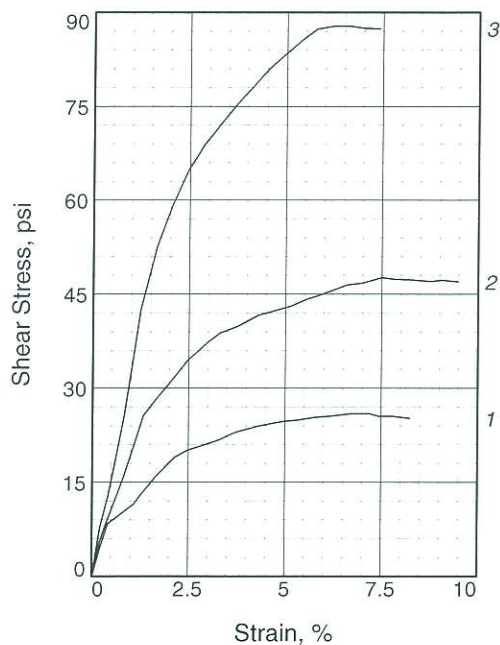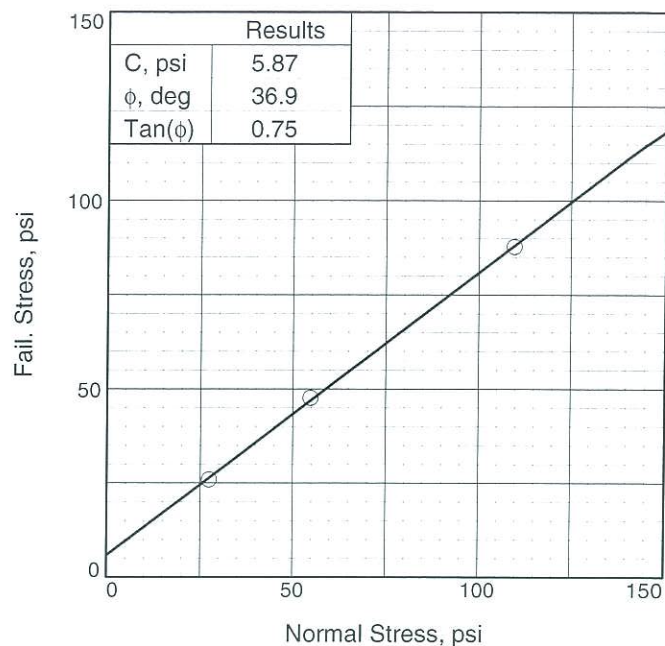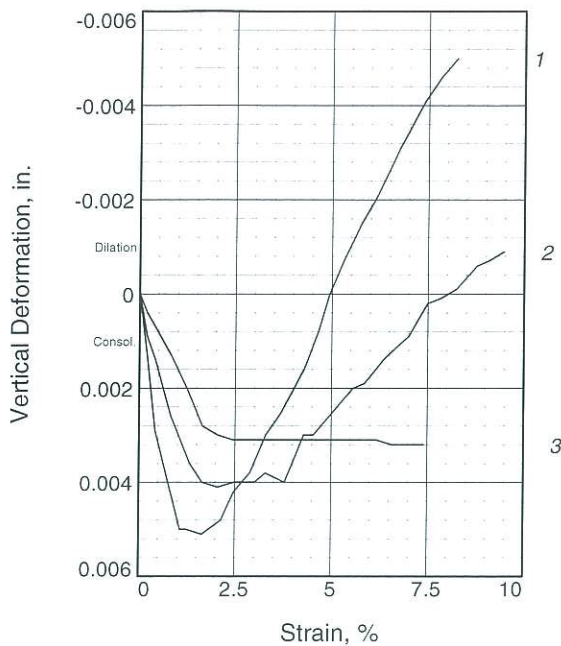
Sample No.		1	2	3
Initial	Water Content, %	13.3	13.2	13.1
	Dry Density, pcf	120.8	120.9	121.1
	Saturation, %	91.1	90.8	90.2
	Void Ratio	0.3949	0.3940	0.3921
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.5	11.5	12.3
	Dry Density, pcf	126.1	128.5	126.4
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.3366	0.3117	0.3335
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.96	0.94	0.96
Normal Stress, psi		27.40	54.70	109.50
Fail. Stress, psi		25.96	47.65	87.85
Strain, %		6.7	7.5	6.6
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0016R, S23A
Sample Number: S36300   **Depth:** 110-110.8
Proj. No.: 11-111   Date Sampled:

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw _____   **Checked By:** mpw _____

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0016R, S23A

Depth: 110-110.8   **Sample Number:**   S36300

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2378.040
Moisture content: Dry soil+tare, gms.	2359.700		2359.700
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	13.3	12.5	12.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	141.8	
Dry density, pcf	120.8	126.1	
Void ratio	0.3949	0.3366	
Saturation, %	91.1	100.0	

Normal stress = 27.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 25.96 psi **at reading no.** 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	20.800	20.8	0.2	4.48	0.2987
2	0.0100	39.000	39.0	0.4	8.41	0.2971
3	0.0260	53.200	53.2	1.1	11.47	0.2950
4	0.0300	59.500	59.5	1.2	12.83	0.2950
5	0.0400	73.700	73.7	1.6	15.89	0.2949
6	0.0520	88.100	88.1	2.1	19.00	0.2952
7	0.0600	93.200	93.2	2.5	20.10	0.2958
8	0.0700	97.000	97.0	2.9	20.92	0.2962
9	0.0800	101.100	101.1	3.3	21.80	0.2970
10	0.0900	106.400	106.4	3.7	22.94	0.2975
11	0.1040	111.000	111.0	4.3	23.93	0.2984
12	0.1130	113.100	113.1	4.7	24.39	0.2992

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	114.500	114.5	4.9	24.69	0.3000
14	0.1300	115.600	115.6	5.3	24.93	0.3008
15	0.1400	117.600	117.6	5.8	25.36	0.3015
16	0.1500	118.500	118.5	6.2	25.55	0.3021
17	0.1640	120.400	120.4	6.7	25.96	0.3031
18	0.1750	120.100	120.1	7.2	25.90	0.3038
19	0.1800	118.600	118.6	7.4	25.57	0.3041
20	0.1900	118.200	118.2	7.8	25.49	0.3046
21	0.2000	116.900	116.9	8.2	25.21	0.3050

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.400		2376.900
Moisture content: Dry soil+tare, gms.	2359.900		2359.900
Moisture content: Tare, gms.	2212.700		2212.700
Moisture, %	13.2	11.5	11.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	143.3	
Dry density, pcf	120.9	128.5	
Void ratio	0.3940	0.3117	
Saturation, %	90.8	100.0	

Normal stress = 54.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 47.65 psi at reading no. 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	26.000	26.0	0.2	5.61	0.2991
2	0.0100	42.800	42.8	0.4	9.23	0.2986
3	0.0200	74.500	74.5	0.8	16.06	0.2974
4	0.0320	118.900	118.9	1.3	25.64	0.2964
5	0.0400	130.800	130.8	1.6	28.20	0.2960
6	0.0500	144.800	144.8	2.1	31.22	0.2959
7	0.0600	159.800	159.8	2.5	34.46	0.2960
8	0.0730	173.400	173.4	3.0	37.39	0.2960
9	0.0800	179.800	179.8	3.3	38.77	0.2962
10	0.0920	185.300	185.3	3.8	39.96	0.2960
11	0.1040	193.100	193.1	4.3	41.64	0.2970
12	0.1100	195.100	195.1	4.5	42.07	0.2970
13	0.1250	200.100	200.1	5.1	43.15	0.2976
14	0.1350	205.200	205.2	5.6	44.25	0.2980
15	0.1420	207.900	207.9	5.8	44.83	0.2981

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
16	0.1540	213.000	213.0	6.3	45.93	0.2986
17	0.1600	215.600	215.6	6.6	46.49	0.2988
18	0.1700	217.100	217.1	7.0	46.81	0.2991
19	0.1820	221.000	221.0	7.5	47.65	0.2998
20	0.1900	219.800	219.8	7.8	47.39	0.2999
21	0.2000	219.400	219.4	8.2	47.31	0.3001
22	0.2130	218.200	218.2	8.8	47.05	0.3006
23	0.2200	219.100	219.1	9.1	47.24	0.3007
24	0.2300	218.100	218.1	9.5	47.03	0.3009

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2362.200
Moisture content: Dry soil+tare, gms.	2344.000		2344.000
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	13.1	12.3	12.3
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	142.0	
Dry density, pcf	121.1	126.4	
Void ratio	0.3921	0.3335	
Saturation, %	90.2	100.0	

Normal stress = 109.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 87.85 psi at reading no. 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	36.000	36.0	0.2	7.76	0.2996
2	0.0100	59.000	59.0	0.4	12.72	0.2993
3	0.0200	119.000	119.0	0.8	25.66	0.2987
4	0.0300	197.500	197.5	1.2	42.59	0.2980
5	0.0400	243.400	243.4	1.6	52.48	0.2972
6	0.0500	275.000	275.0	2.1	59.30	0.2970
7	0.0600	301.100	301.1	2.5	64.92	0.2969
8	0.0700	320.000	320.0	2.9	69.00	0.2969
9	0.0800	334.800	334.8	3.3	72.19	0.2969
10	0.0900	349.300	349.3	3.7	75.32	0.2969
11	0.1000	362.200	362.2	4.1	78.10	0.2969
12	0.1100	375.500	375.5	4.5	80.97	0.2969
13	0.1200	385.900	385.9	4.9	83.21	0.2969
14	0.1330	399.000	399.0	5.5	86.03	0.2969
15	0.1400	405.000	405.0	5.8	87.33	0.2969

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
16	0.1500	407.200	407.2	6.2	87.80	0.2969
17	0.1600	407.400	407.4	6.6	87.85	0.2968
18	0.1700	405.800	405.8	7.0	87.50	0.2968
19	0.1800	405.400	405.4	7.4	87.41	0.2968

Results	
C, psi	2.51
φ, deg	40.0
Tan(φ)	0.84
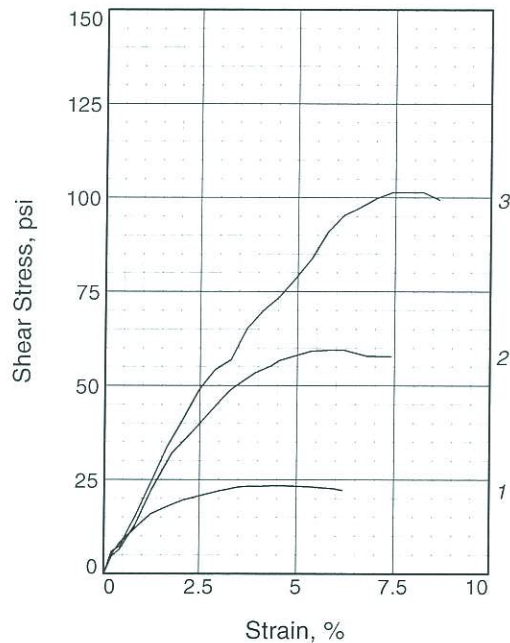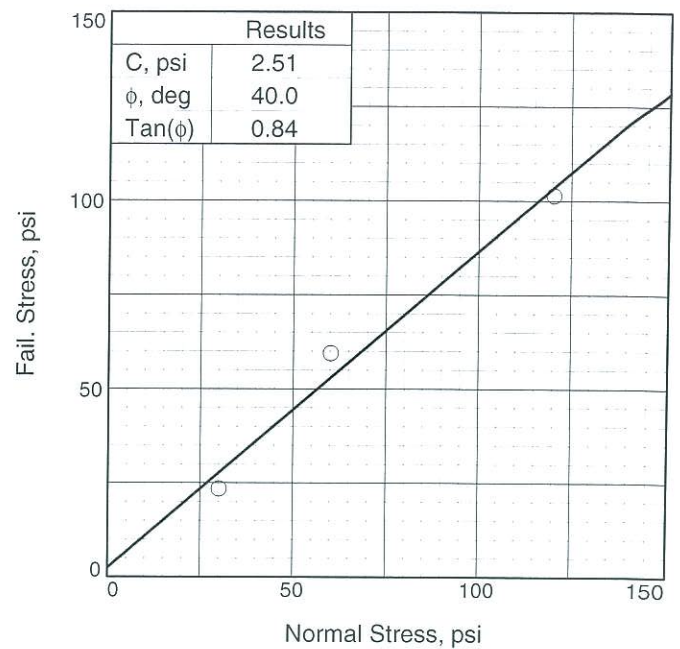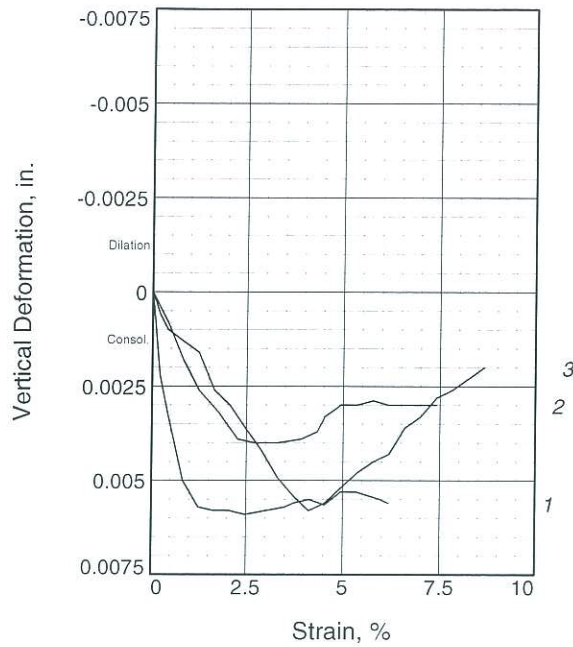
Sample No.		1	2	3
Initial	Water Content, %	15.0	14.8	14.7
	Dry Density, pcf	119.0	119.3	119.4
	Saturation, %	97.6	96.8	96.5
	Void Ratio	0.4161	0.4132	0.4122
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.2	12.2	12.0
	Dry Density, pcf	126.7	126.9	127.2
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.3309	0.3284	0.3252
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.94	0.94	0.94
Normal Stress, psi		30.10	60.10	120.30
Fail. Stress, psi		23.46	59.51	101.43
Strain, %		4.5	6.2	7.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0016R, S25
Sample Number: S36301   **Depth:** 120-121.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0016R, S25

Depth: 120-121.5   **Sample Number:**   S36301

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2375.250
Moisture content: Dry soil+tare, gms.	2357.500		2357.500
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	15.0	12.2	12.2
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	142.2	
Dry density, pcf	119.0	126.7	
Void ratio	0.4161	0.3309	
Saturation, %	97.6	100.0	

Normal stress = 30.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 23.46 psi **at reading no.** 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	24.100	24.1	0.2	5.20	0.2978
2	0.0100	38.300	38.3	0.4	8.26	0.2968
3	0.0200	56.700	56.7	0.8	12.23	0.2950
4	0.0300	74.000	74.0	1.2	15.96	0.2943
5	0.0400	82.900	82.9	1.6	17.88	0.2942
6	0.0500	90.800	90.8	2.1	19.58	0.2942
7	0.0600	95.600	95.6	2.5	20.61	0.2941
8	0.0730	102.000	102.0	3.0	21.99	0.2942
9	0.0850	106.700	106.7	3.5	23.01	0.2943
10	0.0900	107.400	107.4	3.7	23.16	0.2944
11	0.1000	108.000	108.0	4.1	23.29	0.2945
12	0.1100	108.800	108.8	4.5	23.46	0.2944

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	108.000	108.0	4.9	23.29	0.2947
14	0.1300	107.200	107.2	5.3	23.11	0.2947
15	0.1450	104.800	104.8	6.0	22.60	0.2945
16	0.1500	103.000	103.0	6.2	22.21	0.2944

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2359.450
Moisture content: Dry soil+tare, gms.	2341.800		2341.800
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	14.8	12.2	12.2
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	142.3	
Dry density, pcf	119.3	126.9	
Void ratio	0.4132	0.3284	
Saturation, %	96.8	99.9	

Normal stress = 60.1 psi
Strain rate, in./min. = 0.03
Fail. Stress = 59.51 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	21.400	21.4	0.2	4.61	0.2996
2	0.0100	30.200	30.2	0.4	6.51	0.2992
3	0.0200	61.100	61.1	0.8	13.17	0.2982
4	0.0300	103.200	103.2	1.2	22.25	0.2974
5	0.0430	148.800	148.8	1.8	32.08	0.2968
6	0.0550	173.000	173.0	2.3	37.30	0.2961
7	0.0660	197.000	197.0	2.7	42.48	0.2960
8	0.0750	217.000	217.0	3.1	46.79	0.2960
9	0.0800	227.100	227.1	3.3	48.97	0.2960
10	0.0950	247.800	247.8	3.9	53.43	0.2961
11	0.1050	256.300	256.3	4.3	55.26	0.2963
12	0.1100	262.600	262.6	4.5	56.62	0.2967
13	0.1200	268.500	268.5	4.9	57.90	0.2970
14	0.1300	274.400	274.4	5.3	59.17	0.2970
15	0.1400	275.700	275.7	5.8	59.45	0.2971
16	0.1500	276.000	276.0	6.2	59.51	0.2970
17	0.1650	268.100	268.1	6.8	57.81	0.2970
18	0.1700	268.400	268.4	7.0	57.87	0.2970
19	0.1800	268.000	268.0	7.4	57.79	0.2970

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2359.400
Moisture content: Dry soil+tare, gms.	2341.900		2341.900
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	14.7	12.0	12.0
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	142.5	
Dry density, pcf	119.4	127.2	
Void ratio	0.4122	0.3252	
Saturation, %	96.5	100.0	

Normal stress = 120.3 psi

Strain rate, in./min. = 0.03

Fail. Stress = 101.43 psi at reading no. 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	27.400	27.4	0.2	5.91	0.2994
2	0.0100	33.800	33.8	0.4	7.29	0.2990
3	0.0200	71.500	71.5	0.8	15.42	0.2987
4	0.0300	113.600	113.6	1.2	24.49	0.2984
5	0.0400	156.700	156.7	1.6	33.79	0.2974
6	0.0500	190.200	190.2	2.1	41.01	0.2970
7	0.0600	226.400	226.4	2.5	48.82	0.2964
8	0.0700	251.700	251.7	2.9	54.27	0.2958
9	0.0800	263.800	263.8	3.3	56.88	0.2951
10	0.0900	302.400	302.4	3.7	65.20	0.2946
11	0.1000	324.600	324.6	4.1	69.99	0.2942
12	0.1100	341.200	341.2	4.5	73.57	0.2944
13	0.1200	363.700	363.7	4.9	78.42	0.2948
14	0.1300	388.400	388.4	5.3	83.75	0.2952
15	0.1400	421.600	421.6	5.8	90.91	0.2955
16	0.1500	442.200	442.2	6.2	95.35	0.2957
17	0.1600	451.600	451.6	6.6	97.38	0.2964
18	0.1700	462.700	462.7	7.0	99.77	0.2967
19	0.1800	470.400	470.4	7.4	101.43	0.2972
20	0.1900	470.400	470.4	7.8	101.43	0.2974
21	0.2000	470.400	470.4	8.2	101.43	0.2977
22	0.2100	461.300	461.3	8.6	99.47	0.2980

Vertical Deformation, in. vs Strain, % chart (top left): curves labeled 1, 2, 3; y-axis from -0.045 (Dilation) through 0 to 0.045 (Consol.); x-axis Strain, % from 0 to 12.

Fail. Stress, psi vs Normal Stress, psi chart (top right): x-axis 0 to 300, y-axis 0 to 300.

Results	
C, psi	11.37
φ, deg	25.7
Tan(φ)	0.48

Shear Stress, psi vs Strain, % chart (bottom left): curves labeled 1, 2, 3; y-axis 0 to 90; x-axis Strain, % 0 to 20.
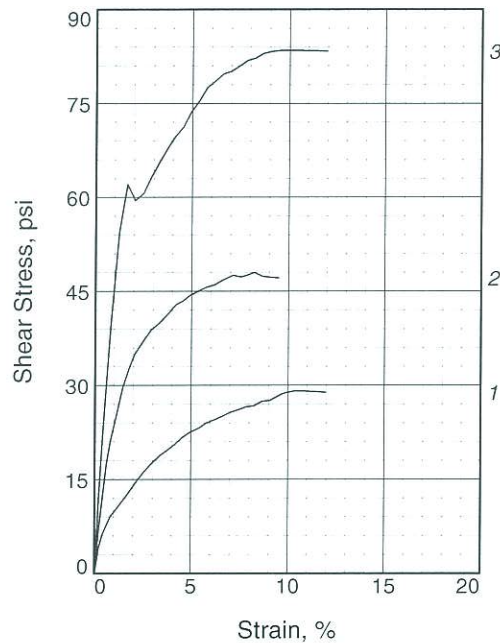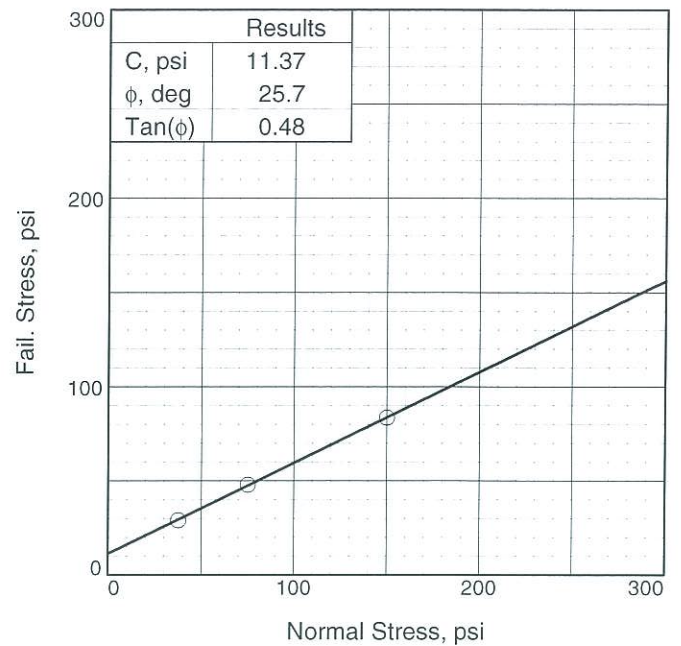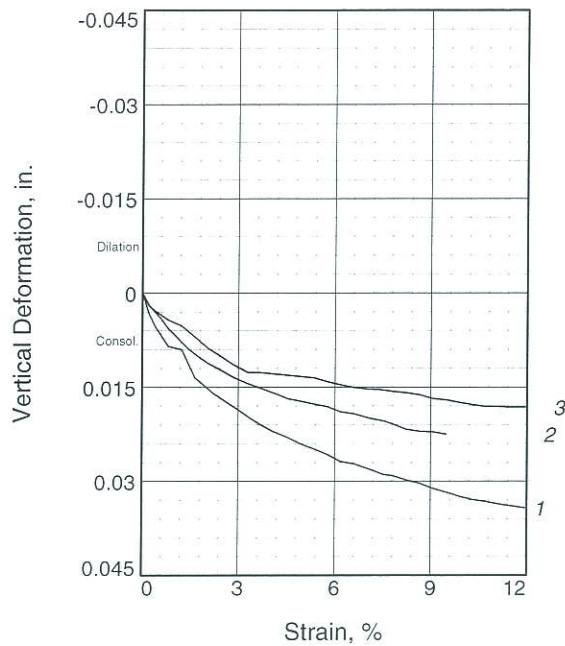
Sample No.		1	2	3
Initial	Water Content, %	31.6	31.6	31.6
	Dry Density, pcf	71.4	71.4	71.4
	Saturation, %	62.8	62.8	62.8
	Void Ratio	1.3613	1.3613	1.3613
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	39.2	41.8	29.9
	Dry Density, pcf	81.8	79.2	93.3
	Saturation, %	100.0	99.9	100.0
	Void Ratio	1.0595	1.1292	0.8066
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.87	0.90	0.77
Normal Stress, psi		37.50	75.00	150.00
Fail. Stress, psi		29.13	48.02	83.53
Strain, %		10.7	8.2	9.9
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0016R, S31
Sample Number: S36302   **Depth:** 150-151.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:	
Client:	URS / HMM/ ARUP
Project:	CA High Speed Train
	Fresno to Bakersfield Geotech Investigation
	#SA-HST019
Project No.:	11-111
Location:	S0016R, S31
Depth:	150-151.5
Description:	
Remarks:	
Type of Sample:	Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2311.200		2317.800
Moisture content: Dry soil+tare, gms.	2283.700		2283.700
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	31.6	39.2	39.2
Moist specimen weight, gms.	114.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.87	
Net decrease in height, in.		0.13	
Wet density, pcf	94.0	114.0	
Dry density, pcf	71.4	81.8	
Void ratio	1.3613	1.0595	
Saturation, %	62.8	100.0	

Normal stress = 37.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 29.13 psi **at reading no.** 27

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	18.900	18.9	0.2	4.08	0.2967
2	0.0100	29.000	29.0	0.4	6.25	0.2945
3	0.0200	42.400	42.4	0.8	9.14	0.2915
4	0.0300	49.700	49.7	1.2	10.72	0.2910
5	0.0400	57.500	57.5	1.6	12.40	0.2865
6	0.0540	69.000	69.0	2.2	14.88	0.2840
7	0.0600	73.900	73.9	2.5	15.93	0.2832
8	0.0700	80.600	80.6	2.9	17.38	0.2818
9	0.0820	87.200	87.2	3.4	18.80	0.2801
10	0.0900	90.600	90.6	3.7	19.54	0.2790
11	0.1000	95.200	95.2	4.1	20.53	0.2779
12	0.1100	100.600	100.6	4.5	21.69	0.2770

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	104.400	104.4	4.9	22.51	0.2760
14	0.1320	107.800	107.8	5.4	23.24	0.2750
15	0.1400	111.300	111.3	5.8	24.00	0.2743
16	0.1500	113.500	113.5	6.2	24.47	0.2732
17	0.1600	116.100	116.1	6.6	25.03	0.2728
18	0.1700	119.000	119.0	7.0	25.66	0.2721
19	0.1830	121.500	121.5	7.5	26.20	0.2711
20	0.1900	123.300	123.3	7.8	26.59	0.2709
21	0.2000	124.000	124.0	8.2	26.74	0.2702
22	0.2100	127.200	127.2	8.6	27.43	0.2697
23	0.2200	128.100	128.1	9.1	27.62	0.2689
24	0.2350	132.800	132.8	9.7	28.63	0.2680
25	0.2400	133.600	133.6	9.9	28.81	0.2676
26	0.2500	134.900	134.9	10.3	29.09	0.2671
27	0.2600	135.100	135.1	10.7	29.13	0.2668
28	0.2700	134.600	134.6	11.1	29.02	0.2664
29	0.2800	134.300	134.3	11.5	28.96	0.2661
30	0.2900	134.000	134.0	11.9	28.89	0.2658

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2327.100		2335.900
Moisture content: Dry soil+tare, gms.	2299.600		2299.600
Moisture content: Tare, gms.	2212.700		2212.700
Moisture, %	31.6	41.8	41.8
Moist specimen weight, gms.	114.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.90	
Net decrease in height, in.		0.10	
Wet density, pcf	94.0	112.2	
Dry density, pcf	71.4	79.2	
Void ratio	1.3613	1.1292	
Saturation, %	62.8	99.9	

Normal stress = 75.0 psi

Strain rate, in./min. = 0.03

Fail. Stress = 48.02 psi at reading no. 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	32.100	32.1	0.2	6.92	0.2981
2	0.0150	81.200	81.2	0.6	17.51	0.2957
3	0.0200	99.000	99.0	0.8	21.35	0.2943
4	0.0350	137.500	137.5	1.4	29.65	0.2911
5	0.0430	151.500	151.5	1.8	32.67	0.2898
6	0.0500	162.000	162.0	2.1	34.93	0.2888
7	0.0600	171.400	171.4	2.5	36.96	0.2877
8	0.0700	180.000	180.0	2.9	38.81	0.2865
9	0.0800	184.900	184.9	3.3	39.87	0.2856
10	0.0900	191.000	191.0	3.7	41.18	0.2848
11	0.1020	199.000	199.0	4.2	42.91	0.2839
12	0.1100	201.400	201.4	4.5	43.43	0.2832
13	0.1200	206.000	206.0	4.9	44.42	0.2828
14	0.1300	209.100	209.1	5.3	45.09	0.2823
15	0.1400	211.900	211.9	5.8	45.69	0.2819
16	0.1500	213.600	213.6	6.2	46.06	0.2811
17	0.1600	217.000	217.0	6.6	46.79	0.2808
18	0.1730	220.500	220.5	7.1	47.55	0.2800
19	0.1830	219.400	219.4	7.5	47.31	0.2796
20	0.1900	220.600	220.6	7.8	47.57	0.2791
21	0.2000	222.700	222.7	8.2	48.02	0.2783
22	0.2100	219.800	219.8	8.6	47.39	0.2780
23	0.2200	219.100	219.1	9.1	47.24	0.2779
24	0.2300	218.600	218.6	9.5	47.14	0.2775

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2311.200		2309.650
Moisture content: Dry soil+tare, gms.	2283.700		2283.700
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	31.6	29.9	29.9
Moist specimen weight, gms.	114.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.77	
Net decrease in height, in.		0.23	
Wet density, pcf	94.0	121.2	
Dry density, pcf	71.4	93.3	
Void ratio	1.3613	0.8066	
Saturation, %	62.8	100.0	

Normal stress = 150 psi
Strain rate, in./min. = 0.03
Fail. Stress = 83.53 psi at reading no. 25

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	56.600	56.6	0.2	12.20	0.2980
2	0.0100	103.000	103.0	0.4	22.21	0.2971
3	0.0200	186.200	186.2	0.8	40.15	0.2957
4	0.0300	252.000	252.0	1.2	54.34	0.2948
5	0.0400	287.900	287.9	1.6	62.08	0.2930
6	0.0500	276.100	276.1	2.1	59.53	0.2912
7	0.0600	281.200	281.2	2.5	60.63	0.2899
8	0.0700	294.100	294.1	2.9	63.42	0.2885
9	0.0800	304.500	304.5	3.3	65.66	0.2874
10	0.0900	314.600	314.6	3.7	67.84	0.2873
11	0.1000	323.700	323.7	4.1	69.80	0.2871
12	0.1100	330.400	330.4	4.5	71.24	0.2869
13	0.1200	341.600	341.6	4.9	73.66	0.2867
14	0.1300	350.100	350.1	5.3	75.49	0.2865
15	0.1400	359.800	359.8	5.8	77.58	0.2859
16	0.1500	364.500	364.5	6.2	78.60	0.2854
17	0.1600	369.700	369.7	6.6	79.72	0.2850
18	0.1700	371.600	371.6	7.0	80.13	0.2847
19	0.1800	375.600	375.6	7.4	80.99	0.2846
20	0.1900	379.700	379.7	7.8	81.87	0.2843
21	0.2000	381.400	381.4	8.2	82.24	0.2841
22	0.2100	385.000	385.0	8.6	83.02	0.2838
23	0.2200	386.400	386.4	9.1	83.32	0.2832
24	0.2300	387.000	387.0	9.5	83.45	0.2830
25	0.2400	387.400	387.4	9.9	83.53	0.2826
26	0.2500	387.100	387.1	10.3	83.47	0.2822
27	0.2600	387.000	387.0	10.7	83.45	0.2819
28	0.2700	386.700	386.7	11.1	83.38	0.2819

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
29	0.2800	386.800	386.8	11.5	83.40	0.2818
30	0.2900	386.500	386.5	11.9	83.34	0.2818

	Results
C, psi	0.52
φ, deg	36.4
Tan(φ)	0.74

Vertical Deformation, in. vs Strain, %

Fail. Stress, psi vs Normal Stress, psi

Shear Stress, psi vs Strain, %

Sample No.		1	2	3
Initial	Water Content, %	8.6	8.7	8.7
	Dry Density, pcf	115.1	114.9	114.9
	Saturation, %	49.8	50.4	50.4
	Void Ratio	0.4646	0.4667	0.4667
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.1	17.2	17.2
	Dry Density, pcf	115.2	115.1	115.2
	Saturation, %	100.0	100.0	99.9
	Void Ratio	0.4627	0.4639	0.4636
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
Normal Stress, psi		1.20	2.40	4.70
Fail. Stress, psi		1.44	2.24	4.01
Strain, %		3.3	4.5	6.6
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold

Description:

Specific Gravity= 2.70

Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Location: S0017R, S02

Sample Number: S36304   **Depth:** 5-6.5

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0017R, S02

Depth: 5-6.5   **Sample Number:**   S36304

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2364.700		2376.700
Moisture content: Dry soil+tare, gms.	2352.700		2352.700
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	8.6	17.1	17.1
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	124.9	135.0	
Dry density, pcf	115.1	115.2	
Void ratio	0.4646	0.4627	
Saturation, %	49.8	100.0	

Normal stress = 1.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.44 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.300	4.3	0.2	0.93	0.2995
2	0.0100	4.800	4.8	0.4	1.03	0.2993
3	0.0200	5.200	5.2	0.8	1.12	0.2992
4	0.0300	5.400	5.4	1.2	1.16	0.2992
5	0.0400	5.700	5.7	1.6	1.23	0.2992
6	0.0500	5.900	5.9	2.1	1.27	0.2991
7	0.0600	6.300	6.3	2.5	1.36	0.2991
8	0.0700	6.600	6.6	2.9	1.42	0.2991
9	0.0800	6.700	6.7	3.3	1.44	0.2990
10	0.0900	6.700	6.7	3.7	1.44	0.2990
11	0.1000	6.300	6.3	4.1	1.36	0.2991
12	0.1100	6.200	6.2	4.5	1.34	0.2991

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	6.000	6.0	4.9	1.29	0.2991

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2348.900		2360.750
Moisture content: Dry soil+tare, gms.	2336.700		2336.700
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	8.7	17.2	17.2
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	124.9	134.9	
Dry density, pcf	114.9	115.1	
Void ratio	0.4667	0.4639	
Saturation, %	50.4	100.0	

Normal stress = 2.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.24 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.100	5.1	0.2	1.10	0.2993
2	0.0100	5.600	5.6	0.4	1.21	0.2991
3	0.0200	5.900	5.9	0.8	1.27	0.2987
4	0.0300	6.300	6.3	1.2	1.36	0.2987
5	0.0400	6.700	6.7	1.6	1.44	0.2986
6	0.0500	7.200	7.2	2.1	1.55	0.2986
7	0.0600	7.700	7.7	2.5	1.66	0.2986
8	0.0700	8.400	8.4	2.9	1.81	0.2987
9	0.0800	8.800	8.8	3.3	1.90	0.2987
10	0.0900	9.400	9.4	3.7	2.03	0.2986
11	0.1000	9.900	9.9	4.1	2.13	0.2987
12	0.1100	10.400	10.4	4.5	2.24	0.2988
13	0.1200	10.300	10.3	4.9	2.22	0.2988
14	0.1300	10.300	10.3	5.3	2.22	0.2989
15	0.1400	10.200	10.2	5.8	2.20	0.2990
16	0.1500	10.000	10.0	6.2	2.16	0.2990

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2364.700		2376.500
Moisture content: Dry soil+tare, gms.	2352.500		2352.500
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	8.7	17.2	17.2
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	124.9	134.9	
Dry density, pcf	114.9	115.2	
Void ratio	0.4667	0.4636	
Saturation, %	50.4	99.9	

Normal stress = 4.7 psi
Strain rate, in./min. = 0.03
Fail. Stress = 4.01 psi at reading no. 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.200	7.2	0.2	1.55	0.2994
2	0.0100	7.700	7.7	0.4	1.66	0.2991
3	0.0200	8.300	8.3	0.8	1.79	0.2988
4	0.0300	8.900	8.9	1.2	1.92	0.2984
5	0.0400	9.400	9.4	1.6	2.03	0.2983
6	0.0500	9.800	9.8	2.1	2.11	0.2983
7	0.0600	10.300	10.3	2.5	2.22	0.2982
8	0.0700	10.700	10.7	2.9	2.31	0.2982
9	0.0800	11.600	11.6	3.3	2.50	0.2980
10	0.0900	12.100	12.1	3.7	2.61	0.2980
11	0.1000	13.000	13.0	4.1	2.80	0.2980
12	0.1100	13.600	13.6	4.5	2.93	0.2980
13	0.1200	14.700	14.7	4.9	3.17	0.2980
14	0.1300	15.600	15.6	5.3	3.36	0.2981
15	0.1400	17.700	17.7	5.8	3.82	0.2981
16	0.1500	18.100	18.1	6.2	3.90	0.2982
17	0.1600	18.600	18.6	6.6	4.01	0.2982
18	0.1700	18.500	18.5	7.0	3.99	0.2982
19	0.1800	18.100	18.1	7.4	3.90	0.2983
20	0.1900	17.700	17.7	7.8	3.82	0.2984

Results

C, psi	2.39
φ, deg	42.5
Tan(φ)	0.92
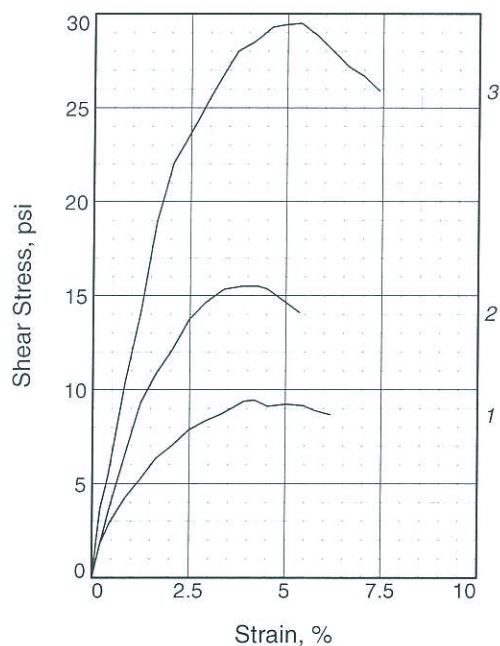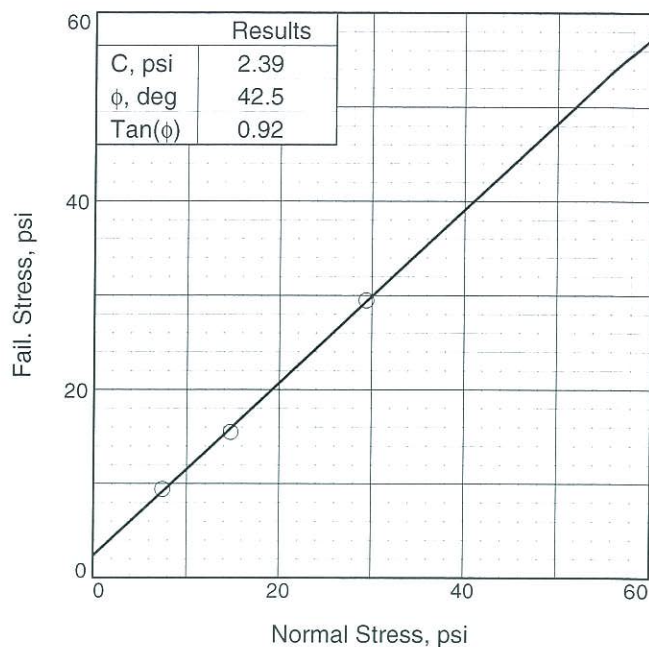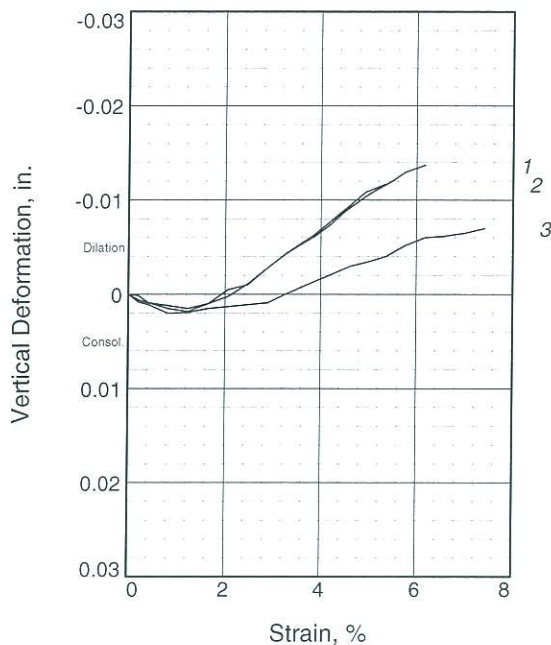
Sample No.		1	2	3
Initial	Water Content, %	19.0	18.9	19.0
	Dry Density, pcf	110.0	110.2	110.0
	Saturation, %	96.6	96.1	96.6
	Void Ratio	0.5325	0.5302	0.5325
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	18.9	18.7	18.6
	Dry Density, pcf	111.5	111.9	112.2
	Saturation, %	99.9	99.9	99.9
	Void Ratio	0.5116	0.5060	0.5026
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.98	0.98
Normal Stress, psi		7.40	14.70	29.40
Fail. Stress, psi		9.44	15.50	29.50
Strain, %		4.2	3.8	5.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0017R, S07
Sample Number: S36306   **Depth:** 30-31.3
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0017R, S07

Depth: 30-31.3   **Sample Number:** S36306

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2371.400		2371.250
Moisture content: Dry soil+tare, gms.	2345.900		2345.900
Moisture content: Tare, gms.	2212.000		2212.000
Moisture, %	19.0	18.9	18.9
Moist specimen weight, gms.	159.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	130.9	132.6	
Dry density, pcf	110.0	111.5	
Void ratio	0.5325	0.5116	
Saturation, %	96.6	99.9	

Load ring constant = 1.2122 lbs. per input unit

Normal stress = 7.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 9.44 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	6.900	8.4	0.2	1.80	0.2994
2	0.0100	10.700	13.0	0.4	2.80	0.2991
3	0.0200	16.100	19.5	0.8	4.21	0.2988
4	0.0300	20.000	24.2	1.2	5.23	0.2985
5	0.0400	24.300	29.5	1.6	6.35	0.2990
6	0.0500	26.900	32.6	2.1	7.03	0.2998
7	0.0600	30.000	36.4	2.5	7.84	0.3011
8	0.0700	31.800	38.5	2.9	8.31	0.3028
9	0.0800	33.200	40.2	3.3	8.68	0.3044
10	0.0950	35.900	43.5	3.9	9.38	0.3063
11	0.1020	36.100	43.8	4.2	9.44	0.3074

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	34.900	42.3	4.5	9.12	0.3089
13	0.1220	35.300	42.8	5.0	9.23	0.3107
14	0.1330	35.000	42.4	5.5	9.15	0.3120
15	0.1400	34.000	41.2	5.8	8.89	0.3130
16	0.1500	33.200	40.2	6.2	8.68	0.3137

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2355.700		2355.500
Moisture content: Dry soil+tare, gms.	2330.400		2330.400
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	18.9	18.7	18.7
Moist specimen weight, gms.	159.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	130.9	132.9	
Dry density, pcf	110.2	111.9	
Void ratio	0.5302	0.5060	
Saturation, %	96.1	99.9	

Normal stress = 14.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 15.50 psi **at reading no.** 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	8.300	8.3	0.2	1.79	0.2999
2	0.0100	16.400	16.4	0.4	3.54	0.2991
3	0.0200	30.100	30.1	0.8	6.49	0.2985
4	0.0300	43.100	43.1	1.2	9.29	0.2982
5	0.0400	50.500	50.5	1.6	10.89	0.2990
6	0.0500	56.400	56.4	2.1	12.16	0.3005
7	0.0600	63.600	63.6	2.5	13.71	0.3010
8	0.0700	67.800	67.8	2.9	14.62	0.3028
9	0.0820	71.200	71.2	3.4	15.35	0.3047
10	0.0930	71.900	71.9	3.8	15.50	0.3062
11	0.1040	71.900	71.9	4.3	15.50	0.3081
12	0.1100	71.200	71.2	4.5	15.35	0.3091
13	0.1200	68.300	68.3	4.9	14.73	0.3109
14	0.1300	65.400	65.4	5.3	14.10	0.3117

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2356.100		2355.500
Moisture content: Dry soil+tare, gms.	2330.600		2330.600
Moisture content: Tare, gms.	2196.700		2196.700
Moisture, %	19.0	18.6	18.6
Moist specimen weight, gms.	159.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	130.9	133.0	
Dry density, pcf	110.0	112.2	
Void ratio	0.5325	0.5026	
Saturation, %	96.6	99.9	

Normal stress = 29.4 psi
Strain rate, in./min. = 0.03
Fail. Stress = 29.50 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	17.100	17.1	0.2	3.69	0.2992
2	0.0100	25.800	25.8	0.4	5.56	0.2989
3	0.0200	48.000	48.0	0.8	10.35	0.2980
4	0.0300	65.600	65.6	1.2	14.14	0.2981
5	0.0400	88.100	88.1	1.6	19.00	0.2985
6	0.0500	102.400	102.4	2.1	22.08	0.2987
7	0.0650	112.800	112.8	2.7	24.32	0.2990
8	0.0700	116.600	116.6	2.9	25.14	0.2991
9	0.0800	123.500	123.5	3.3	26.63	0.3001
10	0.0900	130.000	130.0	3.7	28.03	0.3010
11	0.1000	132.100	132.1	4.1	28.48	0.3019
12	0.1120	135.900	135.9	4.6	29.30	0.3030
13	0.1200	136.400	136.4	4.9	29.41	0.3034
14	0.1300	136.800	136.8	5.3	29.50	0.3040
15	0.1400	133.900	133.9	5.8	28.87	0.3052
16	0.1500	130.100	130.1	6.2	28.05	0.3060
17	0.1600	126.200	126.2	6.6	27.21	0.3062
18	0.1700	123.700	123.7	7.0	26.67	0.3065
19	0.1800	120.100	120.1	7.4	25.90	0.3070

Results	
C, psi	2.45
φ, deg	33.5
Tan(φ)	0.66
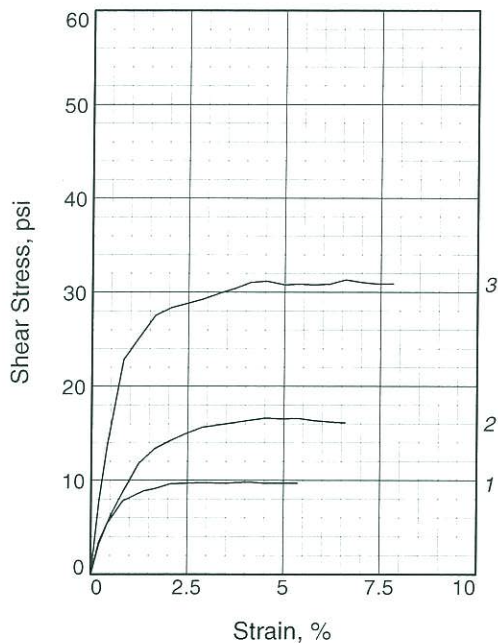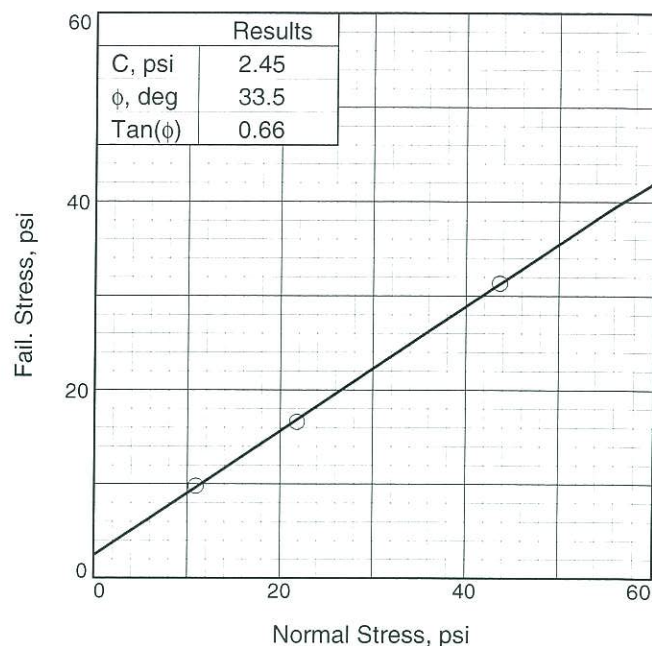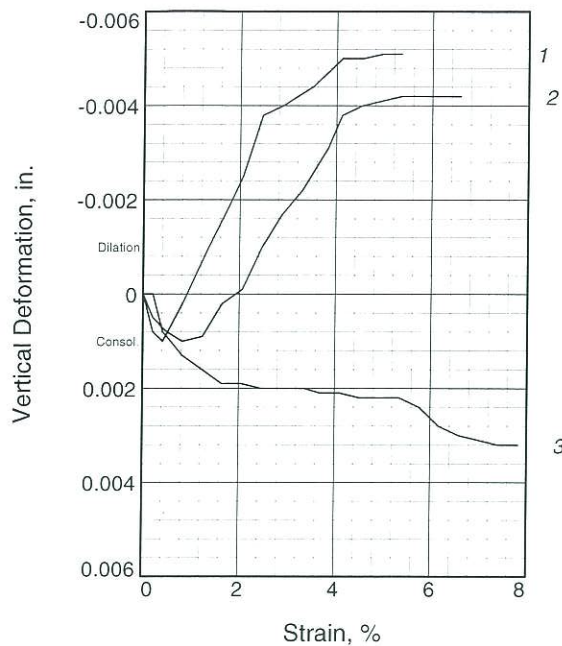
Sample No.		1	2	3
Initial	Water Content, %	10.8	10.9	10.8
	Dry Density, pcf	119.1	118.9	119.0
	Saturation, %	70.0	70.6	70.3
	Void Ratio	0.4151	0.4171	0.4161
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.8	14.2	13.8
	Dry Density, pcf	122.8	121.9	122.7
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.3727	0.3831	0.3739
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.97	0.98	0.97
Normal Stress, psi		10.90	21.80	43.60
Fail. Stress, psi		9.81	16.62	31.35
Strain, %		4.1	4.5	6.6
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0017R, S10
Sample Number: S36307   **Depth:** 45-46.0
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0017R, S10

Depth: 45-46.0   **Sample Number:** S36307

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2357.100		2361.500
Moisture content: Dry soil+tare, gms.	2341.500		2341.500
Moisture content: Tare, gms.	2196.500		2196.500
Moisture, %	10.8	13.8	13.8
Moist specimen weight, gms.	160.6		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	131.9	139.7	
Dry density, pcf	119.1	122.8	
Void ratio	0.4151	0.3727	
Saturation, %	70.0	99.9	

Test Readings for Specimen No. 1

Normal stress = 10.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 9.81 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	15.900	15.9	0.2	3.43	0.2992
2	0.0100	25.000	25.0	0.4	5.39	0.2990
3	0.0200	36.300	36.3	0.8	7.83	0.2998
4	0.0330	41.200	41.2	1.4	8.88	0.3010
5	0.0400	42.300	42.3	1.6	9.12	0.3016
6	0.0500	44.600	44.6	2.1	9.62	0.3025
7	0.0600	44.900	44.9	2.5	9.68	0.3038
8	0.0700	45.200	45.2	2.9	9.75	0.3040
9	0.0850	45.000	45.0	3.5	9.70	0.3044
10	0.0900	45.200	45.2	3.7	9.75	0.3046
11	0.1000	45.500	45.5	4.1	9.81	0.3050
12	0.1100	44.900	44.9	4.5	9.68	0.3050

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	45.000	45.0	4.9	9.70	0.3051
14	0.1300	44.900	44.9	5.3	9.68	0.3051

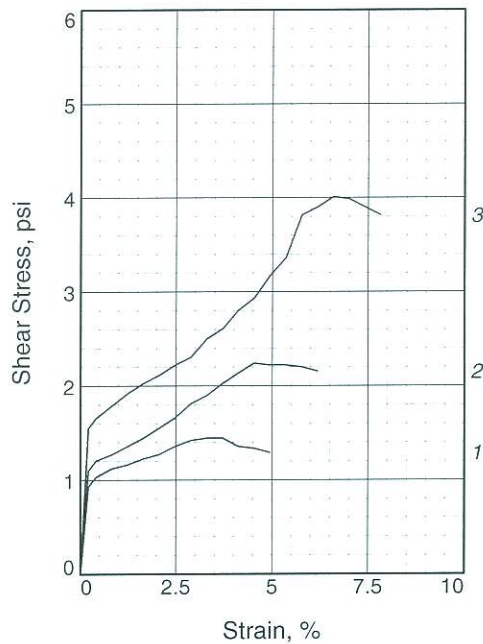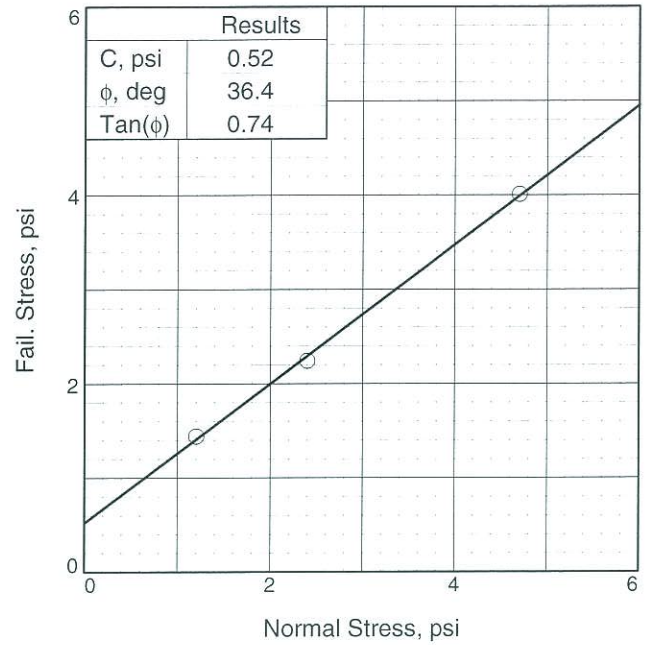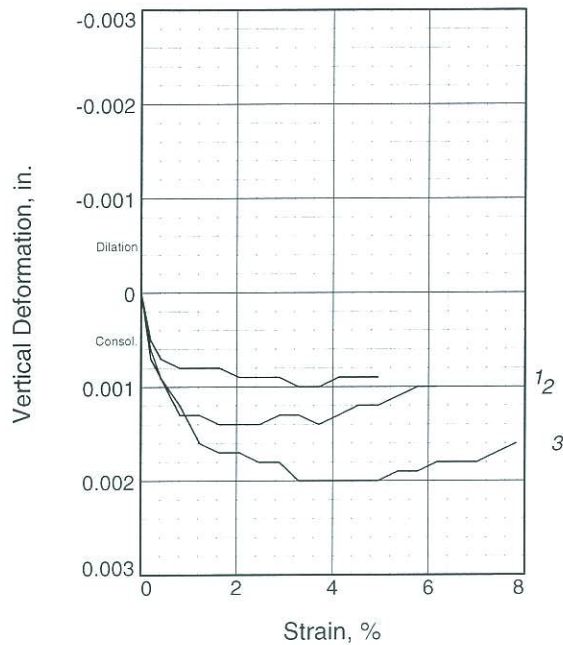| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2373.200		2377.950
Moisture content: Dry soil+tare, gms.	2357.400		2357.400
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	10.9	14.2	14.2
Moist specimen weight, gms.	160.6		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	131.9	139.2	
Dry density, pcf	118.9	121.9	
Void ratio	0.4171	0.3831	
Saturation, %	70.6	100.0	

Normal stress = 21.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 16.62 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	14.600	14.6	0.2	3.15	0.2995
2	0.0120	28.800	28.8	0.5	6.21	0.2992
3	0.0200	40.800	40.8	0.8	8.80	0.2990
4	0.0300	54.900	54.9	1.2	11.84	0.2991
5	0.0400	62.000	62.0	1.6	13.37	0.2998
6	0.0500	66.100	66.1	2.1	14.25	0.3001
7	0.0600	69.500	69.5	2.5	14.99	0.3010
8	0.0700	72.500	72.5	2.9	15.63	0.3017
9	0.0800	73.600	73.6	3.3	15.87	0.3022
10	0.0930	75.300	75.3	3.8	16.24	0.3031
11	0.1000	76.100	76.1	4.1	16.41	0.3038
12	0.1100	77.100	77.1	4.5	16.62	0.3040
13	0.1200	76.700	76.7	4.9	16.54	0.3041
14	0.1300	77.000	77.0	5.3	16.60	0.3042
15	0.1400	75.800	75.8	5.8	16.34	0.3042
16	0.1500	75.200	75.2	6.2	16.21	0.3042
17	0.1600	74.800	74.8	6.6	16.13	0.3042

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2373.200		2377.550
Moisture content: Dry soil+tare, gms.	2357.500		2357.500
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	10.8	13.8	13.8
Moist specimen weight, gms.	160.6		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	131.9	139.7	
Dry density, pcf	119.0	122.7	
Void ratio	0.4161	0.3739	
Saturation, %	70.3	99.9	

Normal stress = 43.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 31.35 psi at reading no. 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	36.100	36.1	0.2	7.78	0.3000
2	0.0100	64.000	64.0	0.4	13.80	0.2992
3	0.0200	106.000	106.0	0.8	22.86	0.2987
4	0.0300	117.000	117.0	1.2	25.23	0.2984
5	0.0400	127.800	127.8	1.6	27.56	0.2981
6	0.0500	131.600	131.6	2.1	28.38	0.2981
7	0.0600	133.700	133.7	2.5	28.83	0.2980
8	0.0700	135.800	135.8	2.9	29.28	0.2980
9	0.0820	139.200	139.2	3.4	30.01	0.2980
10	0.0900	141.100	141.1	3.7	30.42	0.2979
11	0.1000	144.100	144.1	4.1	31.07	0.2979
12	0.1100	144.700	144.7	4.5	31.20	0.2978
13	0.1220	142.800	142.8	5.0	30.79	0.2978
14	0.1300	143.200	143.2	5.3	30.88	0.2978
15	0.1400	142.800	142.8	5.8	30.79	0.2976
16	0.1500	143.200	143.2	6.2	30.88	0.2972
17	0.1600	145.400	145.4	6.6	31.35	0.2970
18	0.1700	144.100	144.1	7.0	31.07	0.2969
19	0.1800	143.200	143.2	7.4	30.88	0.2968
20	0.1900	143.500	143.5	7.8	30.94	0.2968

Results

C, psi	0.58
φ, deg	37.4
Tan(φ)	0.76

Vertical Deformation, in. vs Strain, % (curves 1, 2, 3)

Fail. Stress, psi vs Normal Stress, psi

Shear Stress, psi vs Strain, %
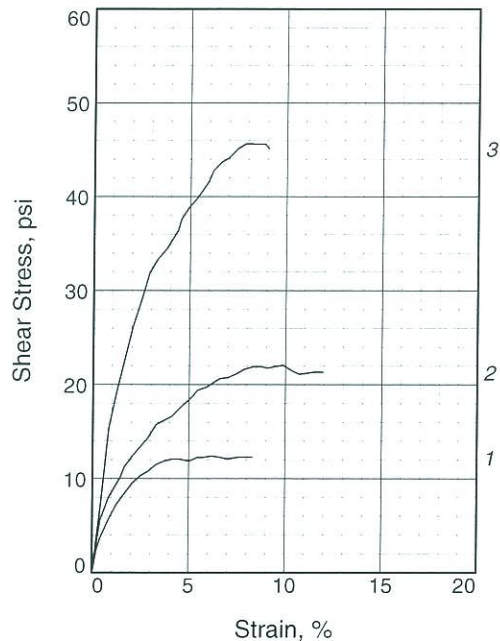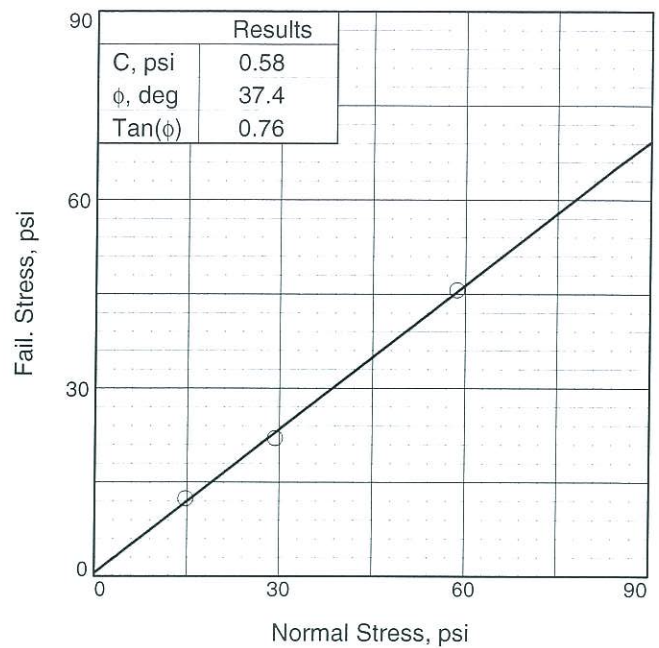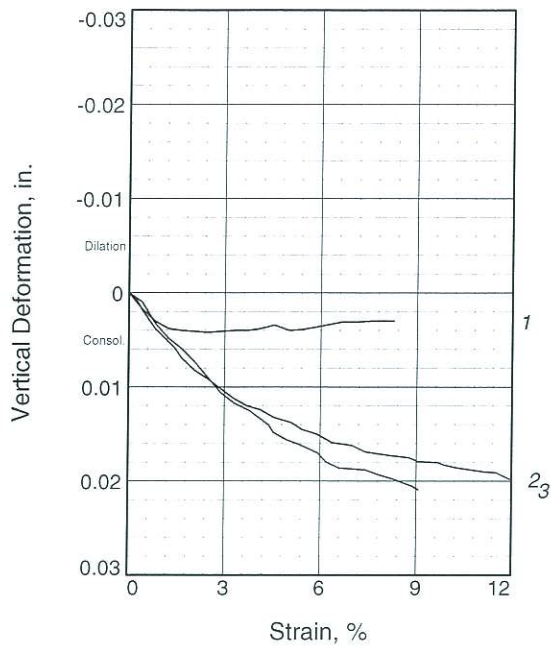
Sample No.		1	2	3
Initial	Water Content, %	11.3	11.5	11.1
	Dry Density, pcf	109.5	109.3	109.7
	Saturation, %	56.7	57.3	55.8
	Void Ratio	0.5393	0.5417	0.5359
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	18.7	18.0	17.0
	Dry Density, pcf	112.0	113.5	115.5
	Saturation, %	100.0	100.0	99.9
	Void Ratio	0.5055	0.4857	0.4591
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.96	0.95
Normal Stress, psi		14.70	29.30	58.60
Fail. Stress, psi		12.40	22.08	45.65
Strain, %		6.2	9.9	7.8
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
 Fresno to Bakersfield Geotech Investigation
Location: S0017R, S13
Sample Number: S36309   **Depth:** 60-61.2
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: js/mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

                         Fresno to Bakersfield Geotech Investigation

                         #SA-HST019

Project No.:   11-111

Location: S0017R, S13

Depth: 60-61.2   **Sample Number:**   S36309

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2361.000		2370.850
Moisture content: Dry soil+tare, gms.	2345.900		2345.900
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	11.3	18.7	18.7
Moist specimen weight, gms.	148.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	121.9	132.9	
Dry density, pcf	109.5	112.0	
Void ratio	0.5393	0.5055	
Saturation, %	56.7	100.0	

Test Readings for Specimen No. 1

Normal stress = 14.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 12.40 psi **at reading no.** 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	11.000	11.0	0.2	2.37	0.2991
2	0.0100	17.100	17.1	0.4	3.69	0.2983
3	0.0200	26.000	26.0	0.8	5.61	0.2970
4	0.0300	33.400	33.4	1.2	7.20	0.2962
5	0.0400	38.900	38.9	1.6	8.39	0.2960
6	0.0500	44.000	44.0	2.1	9.49	0.2959
7	0.0600	47.800	47.8	2.5	10.31	0.2958
8	0.0700	50.200	50.2	2.9	10.82	0.2959
9	0.0800	53.300	53.3	3.3	11.49	0.2960
10	0.0900	55.000	55.0	3.7	11.86	0.2960
11	0.1000	55.900	55.9	4.1	12.05	0.2962
12	0.1100	56.000	56.0	4.5	12.07	0.2966

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1220	55.000	55.0	5.0	11.86	0.2960
14	0.1310	56.700	56.7	5.4	12.23	0.2961
15	0.1400	57.000	57.0	5.8	12.29	0.2963
16	0.1500	57.500	57.5	6.2	12.40	0.2966
17	0.1610	57.000	57.0	6.6	12.29	0.2969
18	0.1700	56.100	56.1	7.0	12.10	0.2969
19	0.1830	57.000	57.0	7.5	12.29	0.2970
20	0.1920	57.000	57.0	7.9	12.29	0.2970
21	0.2010	57.000	57.0	8.3	12.29	0.2970

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2361.000		2369.650
Moisture content: Dry soil+tare, gms.	2345.700		2345.700
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	11.5	18.0	18.0
Moist specimen weight, gms.	148.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	121.9	133.9	
Dry density, pcf	109.3	113.5	
Void ratio	0.5417	0.4857	
Saturation, %	57.3	100.0	

Normal stress = 29.3 psi

Strain rate, in./min. = 0.03

Fail. Stress = 22.08 psi at reading no. 25

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	13.600	13.6	0.2	2.93	0.2994
2	0.0100	26.000	26.0	0.4	5.61	0.2982
3	0.0200	36.800	36.8	0.8	7.93	0.2962
4	0.0350	47.100	47.1	1.4	10.16	0.2941
5	0.0400	52.200	52.2	1.6	11.26	0.2931
6	0.0500	57.400	57.4	2.1	12.38	0.2918
7	0.0600	62.100	62.1	2.5	13.39	0.2909
8	0.0700	66.900	66.9	2.9	14.43	0.2898
9	0.0800	73.100	73.1	3.3	15.76	0.2888
10	0.0900	75.200	75.2	3.7	16.21	0.2880
11	0.1000	77.100	77.1	4.1	16.62	0.2876
12	0.1100	81.400	81.4	4.5	17.55	0.2868
13	0.1240	86.300	86.3	5.1	18.61	0.2862
14	0.1320	90.000	90.0	5.4	19.41	0.2855
15	0.1430	91.500	91.5	5.9	19.73	0.2850

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
16	0.1550	94.500	94.5	6.4	20.38	0.2841
17	0.1600	95.800	95.8	6.6	20.66	0.2840
18	0.1700	96.200	96.2	7.0	20.74	0.2838
19	0.1800	98.000	98.0	7.4	21.13	0.2831
20	0.1900	100.300	100.3	7.8	21.63	0.2829
21	0.2000	101.400	101.4	8.2	21.86	0.2827
22	0.2130	101.600	101.6	8.8	21.91	0.2825
23	0.2200	101.000	101.0	9.1	21.78	0.2821
24	0.2350	102.100	102.1	9.7	22.02	0.2820
25	0.2400	102.400	102.4	9.9	22.08	0.2817
26	0.2500	99.800	99.8	10.3	21.52	0.2814
27	0.2600	98.000	98.0	10.7	21.13	0.2812
28	0.2700	98.400	98.4	11.1	21.22	0.2810
29	0.2800	99.000	99.0	11.5	21.35	0.2809
30	0.2900	98.900	98.9	11.9	21.33	0.2802

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2361.000		2368.900
Moisture content: Dry soil+tare, gms.	2346.200		2346.200
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	11.1	17.0	17.0
Moist specimen weight, gms.	148.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	121.9	135.1	
Dry density, pcf	109.7	115.5	
Void ratio	0.5359	0.4591	
Saturation, %	55.8	99.9	

Normal stress = 58.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 45.65 psi **at reading no.** 20

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	16.100	16.1	0.2	3.47	0.2995
2	0.0100	32.000	32.0	0.4	6.90	0.2990
3	0.0200	71.200	71.2	0.8	15.35	0.2968
4	0.0300	89.200	89.2	1.2	19.23	0.2952
5	0.0400	105.600	105.6	1.6	22.77	0.2941
6	0.0500	121.400	121.4	2.1	26.18	0.2927
7	0.0610	135.100	135.1	2.5	29.13	0.2909
8	0.0700	147.700	147.7	2.9	31.85	0.2894
9	0.0800	154.400	154.4	3.3	33.29	0.2883
10	0.0920	160.000	160.0	3.8	34.50	0.2875
11	0.1060	168.900	168.9	4.4	36.42	0.2860
12	0.1100	174.600	174.6	4.5	37.65	0.2852
13	0.1200	180.400	180.4	4.9	38.90	0.2844
14	0.1300	185.000	185.0	5.3	39.89	0.2839
15	0.1440	192.800	192.8	5.9	41.57	0.2830
16	0.1500	198.400	198.4	6.2	42.78	0.2821
17	0.1600	202.600	202.6	6.6	43.69	0.2814
18	0.1700	204.800	204.8	7.0	44.16	0.2813
19	0.1800	209.300	209.3	7.4	45.13	0.2812
20	0.1900	211.700	211.7	7.8	45.65	0.2807
21	0.2000	211.600	211.6	8.2	45.63	0.2803
22	0.2150	211.500	211.5	8.8	45.60	0.2795
23	0.2200	209.400	209.4	9.1	45.15	0.2791

Vertical Deformation vs Strain (upper left graph)

Vertical Deformation, in. (y-axis: -0.006 to 0.006, with Dilation above 0 and Consol. below)
Strain, % (x-axis: 0 to 8)
Curves labeled 2, 1, 3

Fail. Stress vs Normal Stress (upper right graph)

Results	
C, psi	2.42
φ, deg	39.3
Tan(φ)	0.82

Fail. Stress, psi (y-axis: 0 to 150)
Normal Stress, psi (x-axis: 0 to 150)

Shear Stress vs Strain (lower left graph)

Shear Stress, psi (y-axis: 0 to 90)
Strain, % (x-axis: 0 to 10)
Curves labeled 3, 2, 1

Data Table

Sample No.		1	2	3
Initial	Water Content, %	11.7	11.7	11.9
	Dry Density, pcf	122.6	122.6	122.4
	Saturation, %	84.1	84.4	85.0
	Void Ratio	0.3744	0.3753	0.3771
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.6	11.9	12.6
	Dry Density, pcf	125.7	127.5	125.8
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.3414	0.3225	0.3394
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.96	0.97
Normal Stress, psi		20.80	41.70	83.30
Fail. Stress, psi		19.47	36.48	70.58
Strain, %		4.1	6.2	6.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold

Description:

Specific Gravity= 2.70

Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Location: S0017R, S18A

Sample Number: S36310   **Depth:** 85-85.5

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

DIRECT SHEAR TEST

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019
Project No.: 11-111
Location: S0017R, S18A
Depth: 85-85.5 **Sample Number:** S36310
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70 **LL=** **PL=** **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2380.750
Moisture content: Dry soil+tare, gms.	2361.900		2361.900
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	11.7	12.6	12.6
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	136.9	141.5	
Dry density, pcf	122.6	125.7	
Void ratio	0.3744	0.3414	
Saturation, %	84.1	99.9	

Normal stress = 20.8 psi
Strain rate, in./min. = 0.03
Fail. Stress = 19.47 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	14.600	14.6	0.2	3.15	0.2997
2	0.0100	20.400	20.4	0.4	4.40	0.2992
3	0.0200	35.600	35.6	0.8	7.68	0.2985
4	0.0300	58.900	58.9	1.2	12.70	0.2978
5	0.0400	67.600	67.6	1.6	14.58	0.2974
6	0.0500	78.600	78.6	2.1	16.95	0.2975
7	0.0600	84.700	84.7	2.5	18.26	0.2979
8	0.0700	86.300	86.3	2.9	18.61	0.2984
9	0.0800	88.600	88.6	3.3	19.10	0.2987
10	0.0900	90.200	90.2	3.7	19.45	0.2990
11	0.1000	90.300	90.3	4.1	19.47	0.2992
12	0.1100	90.300	90.3	4.5	19.47	0.2994

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	90.000	90.0	4.9	19.41	0.2995
14	0.1300	90.200	90.2	5.3	19.45	0.2995
15	0.1400	89.700	89.7	5.8	19.34	0.2996

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2363.600
Moisture content: Dry soil+tare, gms.	2345.800		2345.800
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	11.7	11.9	11.9
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	142.7	
Dry density, pcf	122.6	127.5	
Void ratio	0.3753	0.3225	
Saturation, %	84.4	99.9	

Normal stress = 41.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 36.48 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	27.100	27.1	0.2	5.84	0.2998
2	0.0100	50.800	50.8	0.4	10.95	0.2991
3	0.0200	71.100	71.1	0.8	15.33	0.2989
4	0.0300	96.000	96.0	1.2	20.70	0.2986
5	0.0400	113.600	113.6	1.6	24.49	0.2985
6	0.0550	129.800	129.8	2.3	27.99	0.2992
7	0.0600	134.000	134.0	2.5	28.89	0.2997
8	0.0700	140.000	140.0	2.9	30.19	0.3001
9	0.0800	146.000	146.0	3.3	31.48	0.3009
10	0.0900	151.800	151.8	3.7	32.73	0.3016
11	0.1000	156.000	156.0	4.1	33.64	0.3021
12	0.1100	159.000	159.0	4.5	34.28	0.3030
13	0.1200	163.100	163.1	4.9	35.17	0.3033
14	0.1300	166.800	166.8	5.3	35.97	0.3040
15	0.1400	168.900	168.9	5.8	36.42	0.3042
16	0.1500	169.200	169.2	6.2	36.48	0.3043
17	0.1600	169.100	169.1	6.6	36.46	0.3045
18	0.1700	168.700	168.7	7.0	36.38	0.3045
19	0.1800	168.400	168.4	7.4	36.31	0.3046

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2380.340
Moisture content: Dry soil+tare, gms.	2361.600		2361.600
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	11.9	12.6	12.6
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.^{2}	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	136.9	141.7	
Dry density, pcf	122.4	125.8	
Void ratio	0.3771	0.3394	
Saturation, %	85.0	100.0	

Load ring constant = .8988 lbs. per input unit

Normal stress = 83.3 psi

Strain rate, in./min. = 0.03

Fail. Stress = 70.58 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	48.600	43.7	0.2	9.42	0.2994
2	0.0100	78.400	70.5	0.4	15.19	0.2988
3	0.0200	132.600	119.2	0.8	25.70	0.2978
4	0.0300	186.400	167.5	1.2	36.12	0.2970
5	0.0400	226.100	203.2	1.6	43.82	0.2968
6	0.0500	268.400	241.2	2.1	52.02	0.2966
7	0.0600	284.300	255.5	2.5	55.10	0.2960
8	0.0700	316.200	284.2	2.9	61.28	0.2962
9	0.0800	321.200	288.7	3.3	62.25	0.2965
10	0.0900	330.700	297.2	3.7	64.09	0.2966
11	0.1000	340.700	306.2	4.1	66.03	0.2968
12	0.1100	345.600	310.6	4.5	66.98	0.2971
13	0.1200	356.700	320.6	4.9	69.13	0.2971
14	0.1300	360.000	323.6	5.3	69.77	0.2972
15	0.1400	361.600	325.0	5.8	70.08	0.2972
16	0.1500	364.200	327.3	6.2	70.58	0.2974
17	0.1600	362.800	326.1	6.6	70.31	0.2975

Results

C, psi	3.00
φ, deg	36.6
Tan(φ)	0.74
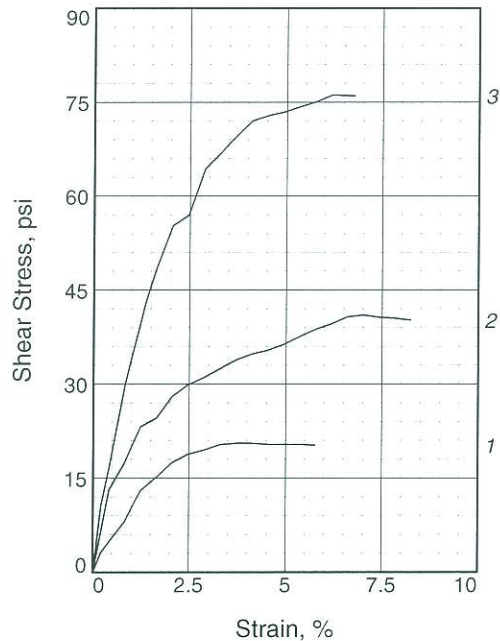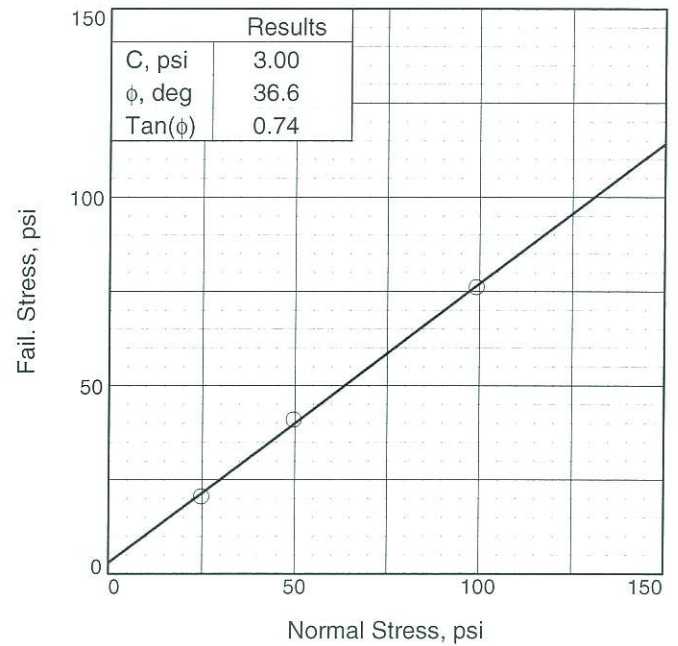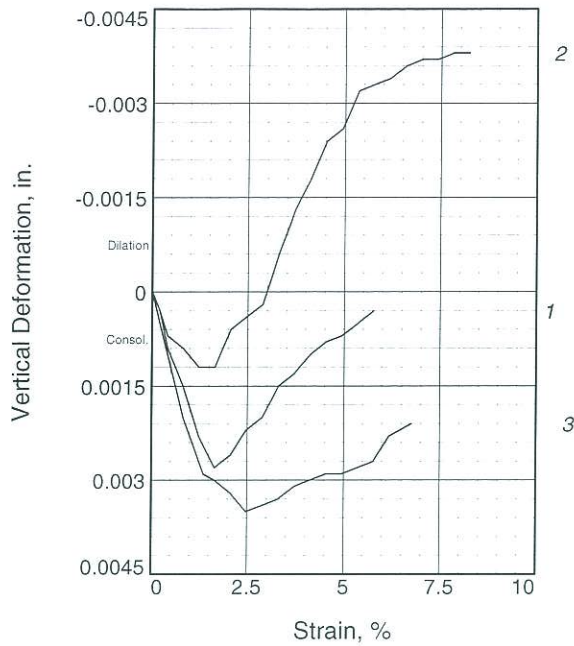
Sample No.		1	2	3
Initial	Water Content, %	14.0	14.0	14.2
	Dry Density, pcf	120.1	120.1	119.9
	Saturation, %	93.8	93.8	94.4
	Void Ratio	0.4035	0.4035	0.4054
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.9	12.9	13.4
	Dry Density, pcf	122.6	125.1	123.8
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.3746	0.3475	0.3613
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.96	0.97
Normal Stress, psi		24.80	49.60	99.20
Fail. Stress, psi		20.57	41.01	76.14
Strain, %		4.1	7.0	6.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold

Description:

Specific Gravity= 2.70

Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
   Fresno to Bakersfield Geotech Investigation

Location: S0017R, S21

Sample Number: S36311   **Depth:** 100-100.9

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0017R, S21

Depth: 100-100.9   **Sample Number:**   S36311

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2379.060
Moisture content: Dry soil+tare, gms.	2358.800		2358.800
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	14.0	13.9	13.9
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	136.9	139.6	
Dry density, pcf	120.1	122.6	
Void ratio	0.4035	0.3746	
Saturation, %	93.8	99.9	

Normal stress = 24.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 20.57 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	14.500	14.5	0.2	3.13	0.2997
2	0.0100	22.300	22.3	0.4	4.81	0.2991
3	0.0200	37.600	37.6	0.8	8.11	0.2985
4	0.0300	60.400	60.4	1.2	13.02	0.2977
5	0.0400	70.200	70.2	1.6	15.14	0.2972
6	0.0500	81.200	81.2	2.1	17.51	0.2974
7	0.0600	87.200	87.2	2.5	18.80	0.2978
8	0.0700	90.400	90.4	2.9	19.49	0.2980
9	0.0800	94.300	94.3	3.3	20.33	0.2985
10	0.0900	95.300	95.3	3.7	20.55	0.2987
11	0.1000	95.400	95.4	4.1	20.57	0.2990
12	0.1100	94.700	94.7	4.5	20.42	0.2992

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	94.500	94.5	4.9	20.38	0.2993
14	0.1300	94.600	94.6	5.3	20.40	0.2995
15	0.1400	93.900	93.9	5.8	20.25	0.2997

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2361.600
Moisture content: Dry soil+tare, gms.	2342.800		2342.800
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	14.0	12.9	12.9
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	141.2	
Dry density, pcf	120.1	125.1	
Void ratio	0.4035	0.3475	
Saturation, %	93.8	99.9	

Normal stress = 49.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 41.01 psi at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	30.200	30.2	0.2	6.51	0.2997
2	0.0100	60.800	60.8	0.4	13.11	0.2993
3	0.0200	81.400	81.4	0.8	17.55	0.2991
4	0.0300	107.600	107.6	1.2	23.20	0.2988
5	0.0400	114.000	114.0	1.6	24.58	0.2988
6	0.0500	130.200	130.2	2.1	28.07	0.2994
7	0.0600	138.700	138.7	2.5	29.91	0.2996
8	0.0700	144.200	144.2	2.9	31.09	0.2998
9	0.0800	150.700	150.7	3.3	32.49	0.3006
10	0.0900	157.200	157.2	3.7	33.90	0.3013
11	0.1000	161.300	161.3	4.1	34.78	0.3018
12	0.1100	164.200	164.2	4.5	35.41	0.3024
13	0.1200	168.500	168.5	4.9	36.33	0.3026
14	0.1300	174.400	174.4	5.3	37.60	0.3032
15	0.1400	179.600	179.6	5.8	38.73	0.3033
16	0.1500	183.600	183.6	6.2	39.59	0.3034
17	0.1600	188.900	188.9	6.6	40.73	0.3036
18	0.1700	190.200	190.2	7.0	41.01	0.3037
19	0.1800	188.700	188.7	7.4	40.69	0.3037
20	0.1900	187.900	187.9	7.8	40.52	0.3038
21	0.2000	186.400	186.4	8.2	40.19	0.3038

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2378.140
Moisture content: Dry soil+tare, gms.	2358.600		2358.600
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	14.2	13.4	13.4
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	136.9	140.4	
Dry density, pcf	119.9	123.8	
Void ratio	0.4054	0.3613	
Saturation, %	94.4	100.0	

Load ring constant = .9132 lbs. per input unit
Normal stress = 99.2 psi
Strain rate, in./min. = 0.03
Fail. Stress = 76.14 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	54.000	49.3	0.2	10.63	0.2995
2	0.0100	84.500	77.2	0.4	16.64	0.2990
3	0.0200	151.500	138.3	0.8	29.83	0.2980
4	0.0330	218.500	199.5	1.4	43.02	0.2971
5	0.0400	247.000	225.6	1.6	48.64	0.2970
6	0.0500	281.000	256.6	2.1	55.33	0.2968
7	0.0600	289.200	264.1	2.5	56.95	0.2965
8	0.0700	326.800	298.4	2.9	64.35	0.2966
9	0.0800	340.000	310.5	3.3	66.95	0.2967
10	0.0900	354.000	323.3	3.7	69.71	0.2969
11	0.1000	366.000	334.2	4.1	72.07	0.2970
12	0.1100	370.200	338.1	4.5	72.90	0.2971
13	0.1200	373.000	340.6	4.9	73.45	0.2971
14	0.1300	377.400	344.6	5.3	74.31	0.2972
15	0.1400	381.200	348.1	5.8	75.06	0.2973
16	0.1500	386.700	353.1	6.2	76.14	0.2977
17	0.1640	385.900	352.4	6.7	75.99	0.2979

Results

C, psi	2.14
φ, deg	38.1
Tan(φ)	0.79
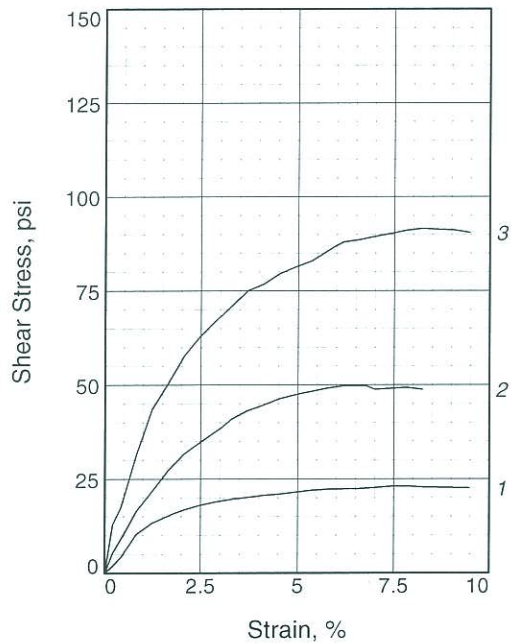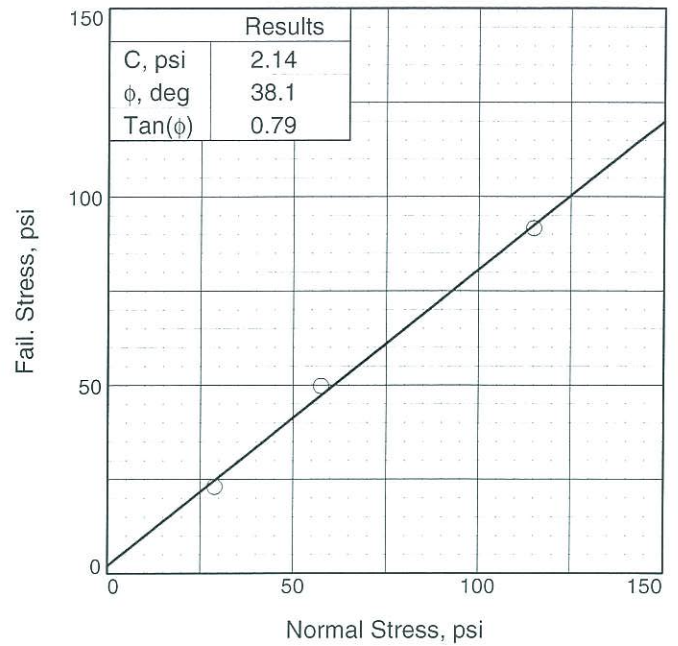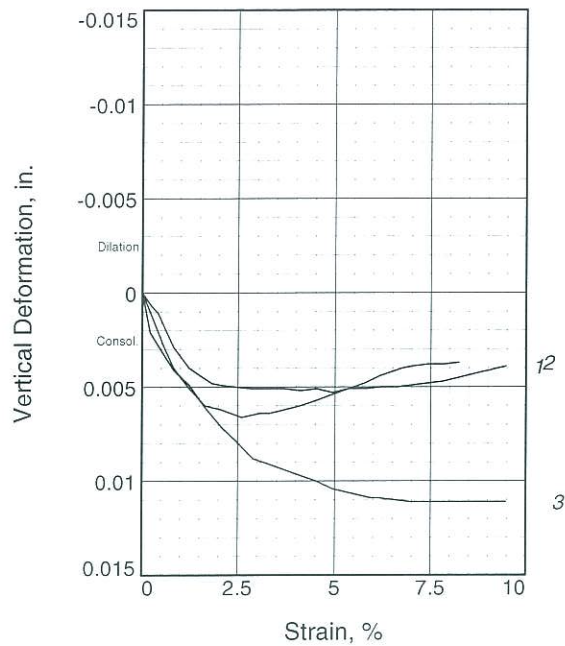
Sample No.		1	2	3
Initial	Water Content, %	13.5	13.2	13.3
	Dry Density, pcf	120.7	120.9	120.8
	Saturation, %	91.7	90.8	91.1
	Void Ratio	0.3968	0.3940	0.3949
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.5	11.9	11.3
	Dry Density, pcf	126.0	127.6	129.1
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.3382	0.3209	0.3057
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.96	0.95	0.94
Normal Stress, psi		28.80	57.50	115.00
Fail. Stress, psi		23.07	49.83	91.62
Strain, %		7.8	6.7	8.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold

Description:

Specific Gravity= 2.70

Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

Location: S0017R, S24

Sample Number: S36312   **Depth:** 115-116.3

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.:   11-111
Location: S0017R, S24
Depth: 115-116.3   **Sample Number:**   S36312
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2361.900
Moisture content: Dry soil+tare, gms.	2343.500		2343.500
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	13.5	12.5	12.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	141.7	
Dry density, pcf	120.7	126.0	
Void ratio	0.3968	0.3382	
Saturation, %	91.7	100.0	

Normal stress = 28.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 23.07 psi **at reading no.** 20

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	8.800	8.8	0.2	1.90	0.2994
2	0.0100	19.200	19.2	0.4	4.14	0.2989
3	0.0200	47.900	47.9	0.8	10.33	0.2971
4	0.0300	61.800	61.8	1.2	13.33	0.2960
5	0.0440	74.000	74.0	1.8	15.96	0.2952
6	0.0500	78.100	78.1	2.1	16.84	0.2951
7	0.0600	83.600	83.6	2.5	18.03	0.2950
8	0.0700	87.900	87.9	2.9	18.95	0.2949
9	0.0800	90.900	90.9	3.3	19.60	0.2949
10	0.0900	93.500	93.5	3.7	20.16	0.2949
11	0.1000	95.800	95.8	4.1	20.66	0.2948
12	0.1100	97.300	97.3	4.5	20.98	0.2949

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	99.500	99.5	4.9	21.45	0.2947
14	0.1300	102.200	102.2	5.3	22.04	0.2949
15	0.1400	103.100	103.1	5.8	22.23	0.2949
16	0.1500	103.700	103.7	6.2	22.36	0.2950
17	0.1600	104.200	104.2	6.6	22.47	0.2950
18	0.1700	105.100	105.1	7.0	22.66	0.2951
19	0.1800	106.800	106.8	7.4	23.03	0.2952
20	0.1900	107.000	107.0	7.8	23.07	0.2953
21	0.2000	106.200	106.2	8.2	22.90	0.2955
22	0.2100	105.800	105.8	8.6	22.81	0.2957
23	0.2200	105.400	105.4	9.1	22.73	0.2959
24	0.2300	105.000	105.0	9.5	22.64	0.2961

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2377.300
Moisture content: Dry soil+tare, gms.	2359.800		2359.800
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	13.2	11.9	11.9
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	136.9	142.8	
Dry density, pcf	120.9	127.6	
Void ratio	0.3940	0.3209	
Saturation, %	90.8	100.0	

Normal stress = 57.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 49.83 psi at reading no. 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	24.800	24.8	0.2	5.35	0.2990
2	0.0130	51.300	51.3	0.5	11.06	0.2973
3	0.0200	76.300	76.3	0.8	16.45	0.2960
4	0.0300	100.800	100.8	1.2	21.73	0.2949
5	0.0400	126.400	126.4	1.6	27.25	0.2940
6	0.0500	146.800	146.8	2.1	31.65	0.2938
7	0.0630	165.000	165.0	2.6	35.58	0.2934
8	0.0740	180.000	180.0	3.0	38.81	0.2936
9	0.0800	190.000	190.0	3.3	40.97	0.2936
10	0.0900	200.500	200.5	3.7	43.23	0.2938
11	0.1000	207.000	207.0	4.1	44.63	0.2940
12	0.1100	215.100	215.1	4.5	46.38	0.2943

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1230	221.400	221.4	5.1	47.74	0.2947
14	0.1300	224.000	224.0	5.3	48.30	0.2949
15	0.1400	227.900	227.9	5.8	49.14	0.2952
16	0.1500	230.800	230.8	6.2	49.77	0.2956
17	0.1640	231.100	231.1	6.7	49.83	0.2960
18	0.1700	226.200	226.2	7.0	48.77	0.2961
19	0.1800	227.400	227.4	7.4	49.03	0.2962
20	0.1900	228.900	228.9	7.8	49.36	0.2962
21	0.2000	226.400	226.4	8.2	48.82	0.2963

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2360.350
Moisture content: Dry soil+tare, gms.	2343.700		2343.700
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	13.3	11.3	11.3
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	143.7	
Dry density, pcf	120.8	129.1	
Void ratio	0.3949	0.3057	
Saturation, %	91.1	100.0	

Load ring constant = 1.1322 lbs. per input unit

Normal stress = 115 psi

Strain rate, in./min. = 0.03

Fail. Stress = 91.62 psi at reading no. 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	52.900	59.9	0.2	12.91	0.2979
2	0.0100	71.100	80.5	0.4	17.36	0.2972
3	0.0200	128.800	145.8	0.8	31.44	0.2959
4	0.0300	178.600	202.2	1.2	43.60	0.2951
5	0.0400	206.400	233.7	1.6	50.39	0.2939
6	0.0500	236.100	267.3	2.1	57.64	0.2929
7	0.0600	257.000	291.0	2.5	62.74	0.2921
8	0.0700	275.000	311.4	2.9	67.14	0.2912
9	0.0800	291.000	329.5	3.3	71.04	0.2909
10	0.0900	307.500	348.2	3.7	75.07	0.2906
11	0.1000	314.600	356.2	4.1	76.80	0.2903
12	0.1100	326.000	369.1	4.5	79.59	0.2900
13	0.1200	333.400	377.5	4.9	81.39	0.2896
14	0.1300	339.900	384.8	5.3	82.98	0.2894

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
15	0.1450	356.000	403.1	6.0	86.91	0.2891
16	0.1500	360.700	408.4	6.2	88.06	0.2891
17	0.1600	363.100	411.1	6.6	88.64	0.2890
18	0.1700	366.600	415.1	7.0	89.50	0.2889
19	0.1800	369.800	418.7	7.4	90.28	0.2889
20	0.1900	373.100	422.4	7.8	91.08	0.2889
21	0.2000	375.300	424.9	8.2	91.62	0.2889
22	0.2100	374.200	423.7	8.6	91.35	0.2889
23	0.2200	373.500	422.9	9.1	91.18	0.2889
24	0.2300	370.900	419.9	9.5	90.55	0.2889

Results

C, psi	6.63
φ, deg	31.9
Tan(φ)	0.62

Vertical Deformation, in. vs **Strain, %** (top left chart, curves labeled 1, 2, 3; Dilation, Consol marked)

Fail. Stress, psi vs **Normal Stress, psi** (top right chart)

Shear Stress, psi vs **Strain, %** (bottom left chart, curves labeled 1, 2, 3)

Sample No.		1	2	3
Initial	Water Content, %	14.3	14.2	14.2
	Dry Density, pcf	119.8	119.9	119.9
	Saturation, %	95.0	94.4	94.4
	Void Ratio	0.4074	0.4054	0.4054
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.1	12.7	12.5
	Dry Density, pcf	124.6	125.5	126.1
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.3525	0.3428	0.3363
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.96	0.96	0.95
Normal Stress, psi		36.30	72.50	145.00
Fail. Stress, psi		30.01	50.63	97.33
Strain, %		4.9	7.0	7.0
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0017R, S30
Sample Number: S36313   **Depth:** 145-146.0
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

DIRECT SHEAR TEST   2/6/2012

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0017R, S30
Depth: 145-146.0   **Sample Number:**   S36313
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2377.440
Moisture content: Dry soil+tare, gms.	2358.400		2358.400
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	14.3	13.1	13.1
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	140.9	
Dry density, pcf	119.8	124.6	
Void ratio	0.4074	0.3525	
Saturation, %	95.0	100.0	

Normal stress = 36.3 psi
Strain rate, in./min. = 0.03
Fail. Stress = 30.01 psi **at reading no.** 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	18.600	18.6	0.2	4.01	0.2994
2	0.0100	26.800	26.8	0.4	5.78	0.2990
3	0.0200	49.500	49.5	0.8	10.67	0.2981
4	0.0300	77.100	77.1	1.2	16.62	0.2979
5	0.0400	96.500	96.5	1.6	20.81	0.2980
6	0.0500	112.800	112.8	2.1	24.32	0.2981
7	0.0600	124.600	124.6	2.5	26.87	0.2988
8	0.0700	133.700	133.7	2.9	28.83	0.2992
9	0.0800	136.400	136.4	3.3	29.41	0.2996
10	0.0900	138.000	138.0	3.7	29.76	0.3002
11	0.1000	138.100	138.1	4.1	29.78	0.3010
12	0.1100	138.000	138.0	4.5	29.76	0.3012

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	139.200	139.2	4.9	30.01	0.3014
14	0.1300	138.200	138.2	5.3	29.80	0.3015
15	0.1400	137.800	137.8	5.8	29.71	0.3015

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2361.140
Moisture content: Dry soil+tare, gms.	2342.600		2342.600
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	14.2	12.7	12.7
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	136.9	141.5	
Dry density, pcf	119.9	125.5	
Void ratio	0.4054	0.3428	
Saturation, %	94.4	100.0	

Normal stress = 72.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 50.63 psi at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	37.200	37.2	0.2	8.02	0.2997
2	0.0100	70.600	70.6	0.4	15.22	0.2994
3	0.0200	91.700	91.7	0.8	19.77	0.2992
4	0.0300	117.600	117.6	1.2	25.36	0.2989
5	0.0400	124.700	124.7	1.6	26.89	0.2987
6	0.0500	144.800	144.8	2.1	31.22	0.2994
7	0.0600	156.200	156.2	2.5	33.68	0.2995
8	0.0700	172.700	172.7	2.9	37.24	0.2998
9	0.0800	182.200	182.2	3.3	39.29	0.3006
10	0.0900	196.500	196.5	3.7	42.37	0.3012
11	0.1000	206.400	206.4	4.1	44.50	0.3017
12	0.1100	214.600	214.6	4.5	46.27	0.3030
13	0.1200	222.600	222.6	4.9	48.00	0.3032
14	0.1300	227.700	227.7	5.3	49.10	0.3039
15	0.1400	230.700	230.7	5.8	49.74	0.3041
16	0.1500	233.700	233.7	6.2	50.39	0.3043
17	0.1600	234.100	234.1	6.6	50.48	0.3045
18	0.1700	234.800	234.8	7.0	50.63	0.3045
19	0.1800	233.600	233.6	7.4	50.37	0.3046
20	0.1900	231.700	231.7	7.8	49.96	0.3047
21	0.2000	230.700	230.7	8.2	49.74	0.3047

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2376.780
Moisture content: Dry soil+tare, gms.	2358.600		2358.600
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	14.2	12.5	12.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	136.9	141.8	
Dry density, pcf	119.9	126.1	
Void ratio	0.4054	0.3363	
Saturation, %	94.4	100.0	

Normal stress = 145 psi
Strain rate, in./min. = 0.03
Fail. Stress = 97.33 psi at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	72.200	72.2	0.2	15.57	0.2991
2	0.0100	103.600	103.6	0.4	22.34	0.2986
3	0.0200	178.600	178.6	0.8	38.51	0.2976
4	0.0300	224.200	224.2	1.2	48.34	0.2968
5	0.0400	263.100	263.1	1.6	56.73	0.2964
6	0.0500	304.200	304.2	2.1	65.59	0.2961
7	0.0600	325.600	325.6	2.5	70.21	0.2958
8	0.0700	353.400	353.4	2.9	76.20	0.2954
9	0.0800	374.500	374.5	3.3	80.75	0.2951
10	0.0900	394.500	394.5	3.7	85.06	0.2949
11	0.1000	411.600	411.6	4.1	88.75	0.2948
12	0.1100	419.800	419.8	4.5	90.52	0.2948
13	0.1200	422.700	422.7	4.9	91.14	0.2950
14	0.1300	429.700	429.7	5.3	92.65	0.2952
15	0.1400	441.600	441.6	5.8	95.22	0.2955
16	0.1500	450.600	450.6	6.2	97.16	0.2957
17	0.1600	451.200	451.2	6.6	97.29	0.2958
18	0.1700	451.400	451.4	7.0	97.33	0.2958
19	0.1800	450.600	450.6	7.4	97.16	0.2959
20	0.1900	450.400	450.4	7.8	97.12	0.2960
21	0.2000	448.600	448.6	8.2	96.73	0.2960

Vertical Deformation, in. vs Strain, % (upper left chart)

Results	
C, psi	0.76
φ, deg	31.2
Tan(φ)	0.61

Fail. Stress, psi vs Normal Stress, psi (upper right chart)

Shear Stress, psi vs Strain, % (lower left chart)
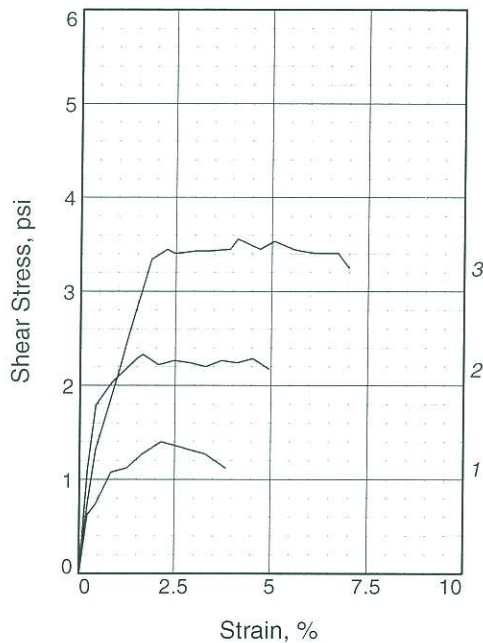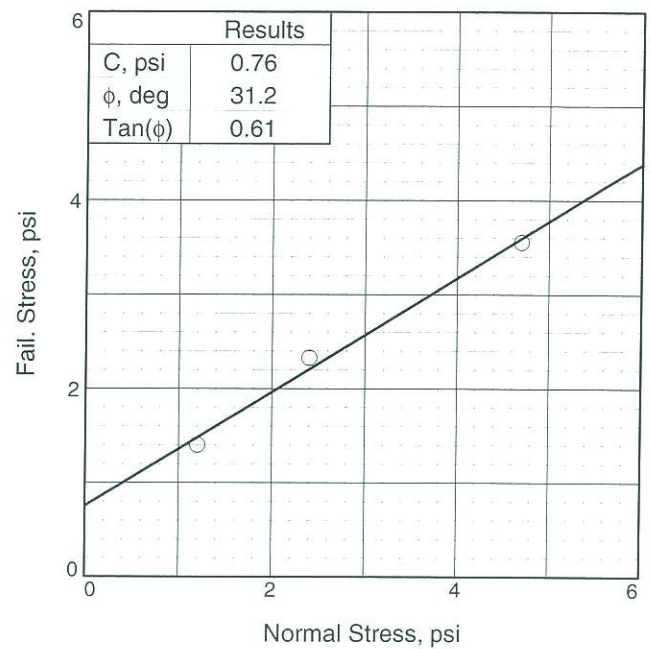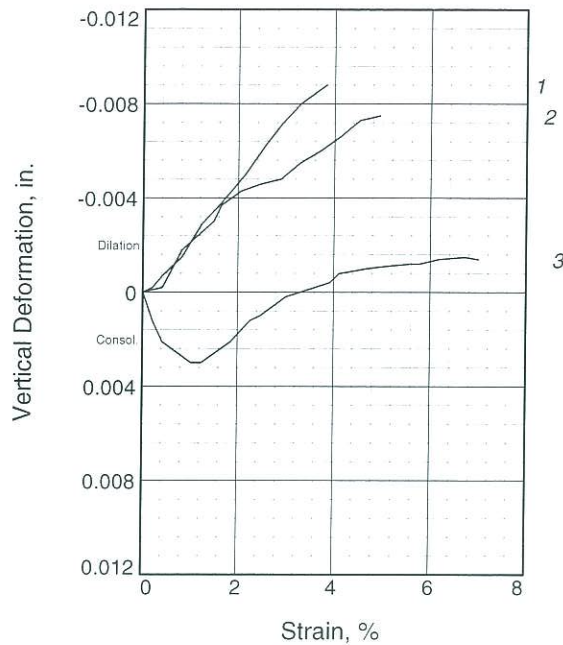
Sample No.		1	2	3
Initial	Water Content, %	10.1	10.3	10.1
	Dry Density, pcf	113.4	113.3	113.4
	Saturation, %	56.3	57.0	56.3
	Void Ratio	0.4858	0.4880	0.4858
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.7	17.6	17.4
	Dry Density, pcf	113.9	114.2	114.7
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.4795	0.4761	0.4699
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
Normal Stress, psi		1.20	2.40	4.70
Fail. Stress, psi		1.40	2.33	3.56
Strain, %		2.1	1.6	4.1
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
Location: S0018R, S02
Sample Number: S36315   **Depth:** 5-6.5
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0018R, S02
Depth: 5-6.5   **Sample Number:**   S36315
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2348.700		2359.200
Moisture content: Dry soil+tare, gms.	2334.700		2334.700
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	10.1	17.7	17.7
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	124.9	134.1	
Dry density, pcf	113.4	113.9	
Void ratio	0.4858	0.4795	
Saturation, %	56.3	99.9	

Normal stress = 1.2 psi
Strain rate, in./min. = 0.03
Fail. Stress = 1.40 psi **at reading no.** 6

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	2.900	2.9	0.2	0.63	0.3002
2	0.0100	3.400	3.4	0.4	0.73	0.3007
3	0.0200	5.000	5.0	0.8	1.08	0.3015
4	0.0300	5.200	5.2	1.2	1.12	0.3029
5	0.0400	5.900	5.9	1.6	1.27	0.3038
6	0.0520	6.500	6.5	2.1	1.40	0.3050
7	0.0620	6.300	6.3	2.6	1.36	0.3062
8	0.0700	6.100	6.1	2.9	1.32	0.3071
9	0.0800	5.900	5.9	3.3	1.27	0.3080
10	0.0930	5.200	5.2	3.8	1.12	0.3088

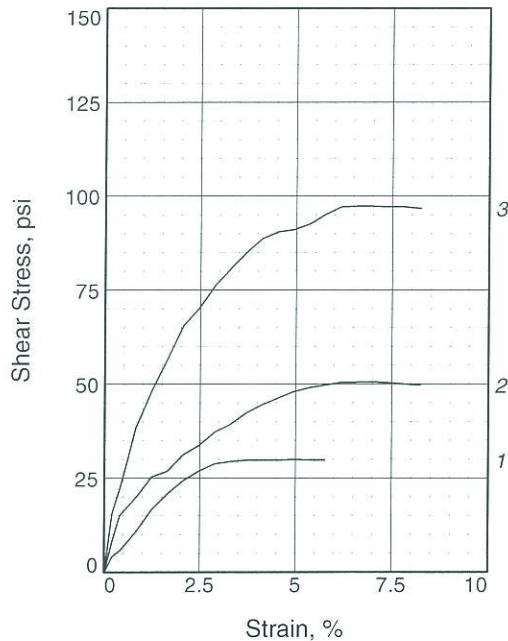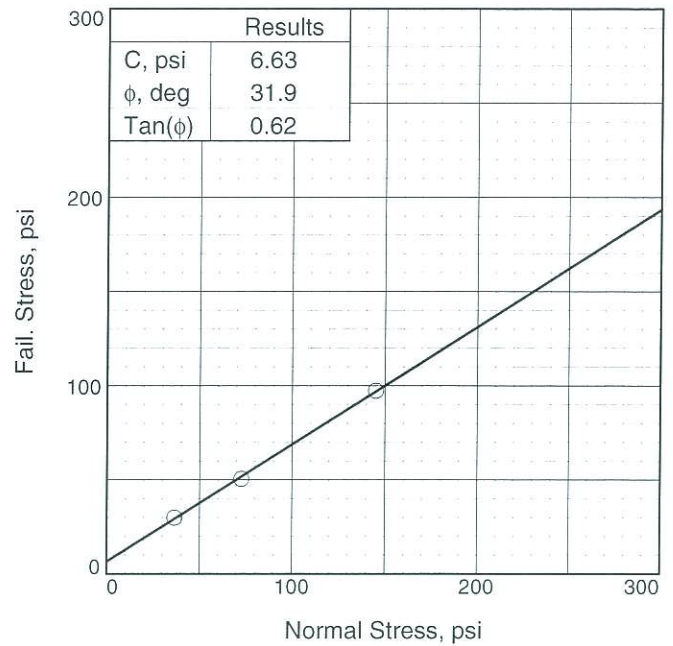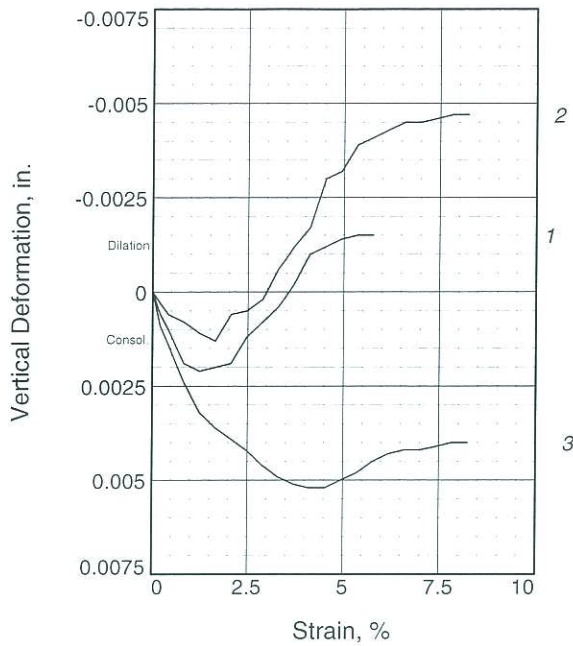| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2364.400		2374.500
Moisture content: Dry soil+tare, gms.	2350.200		2350.200
Moisture content: Tare, gms.	2212.300		2212.300
Moisture, %	10.3	17.6	17.6
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.9	134.3	
Dry density, pcf	113.3	114.2	
Void ratio	0.4880	0.4761	
Saturation, %	57.0	99.9	

Normal stress = 2.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.33 psi at reading no. 5

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.100	5.1	0.2	1.10	0.3001
2	0.0100	8.300	8.3	0.4	1.79	0.3002
3	0.0200	9.400	9.4	0.8	2.03	0.3018
4	0.0360	10.600	10.6	1.5	2.29	0.3030
5	0.0400	10.800	10.8	1.6	2.33	0.3037
6	0.0500	10.300	10.3	2.1	2.22	0.3043
7	0.0600	10.500	10.5	2.5	2.26	0.3046
8	0.0700	10.400	10.4	2.9	2.24	0.3048
9	0.0800	10.200	10.2	3.3	2.20	0.3055
10	0.0900	10.500	10.5	3.7	2.26	0.3060
11	0.1000	10.400	10.4	4.1	2.24	0.3066
12	0.1100	10.600	10.6	4.5	2.29	0.3073
13	0.1200	10.100	10.1	4.9	2.18	0.3075

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2364.700		2374.730
Moisture content: Dry soil+tare, gms.	2350.700		2350.700
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	10.1	17.4	17.4
Moist specimen weight, gms.	152.1		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.9	134.6	
Dry density, pcf	113.4	114.7	
Void ratio	0.4858	0.4699	
Saturation, %	56.3	100.0	

Normal stress = 4.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 3.56 psi at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	3.400	3.4	0.2	0.73	0.2988
2	0.0100	6.100	6.1	0.4	1.32	0.2979
3	0.0250	10.000	10.0	1.0	2.16	0.2970
4	0.0300	11.500	11.5	1.2	2.48	0.2970
5	0.0450	15.500	15.5	1.9	3.34	0.2979
6	0.0550	16.000	16.0	2.3	3.45	0.2988
7	0.0600	15.800	15.8	2.5	3.41	0.2990
8	0.0730	15.900	15.9	3.0	3.43	0.2998
9	0.0800	15.900	15.9	3.3	3.43	0.3000
10	0.0950	16.000	16.0	3.9	3.45	0.3004
11	0.1000	16.500	16.5	4.1	3.56	0.3008
12	0.1140	16.000	16.0	4.7	3.45	0.3010
13	0.1230	16.400	16.4	5.1	3.54	0.3011
14	0.1350	16.000	16.0	5.6	3.45	0.3012
15	0.1400	15.900	15.9	5.8	3.43	0.3012
16	0.1500	15.800	15.8	6.2	3.41	0.3014
17	0.1630	15.800	15.8	6.7	3.41	0.3015
18	0.1700	15.090	15.1	7.0	3.25	0.3014

Results	
C, psi	1.50
φ, deg	38.1
Tan(φ)	0.79
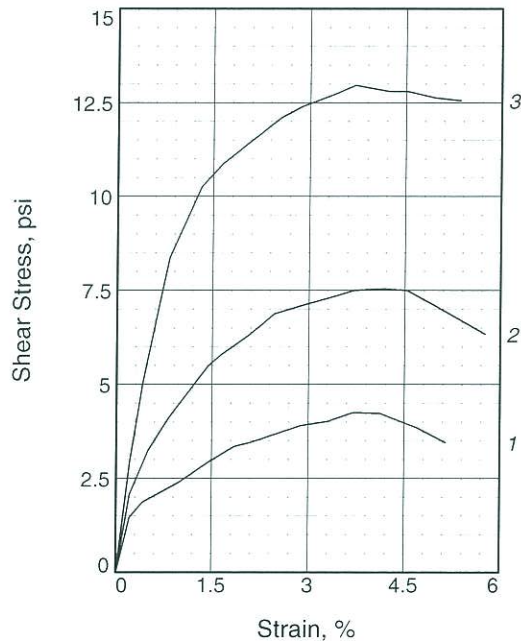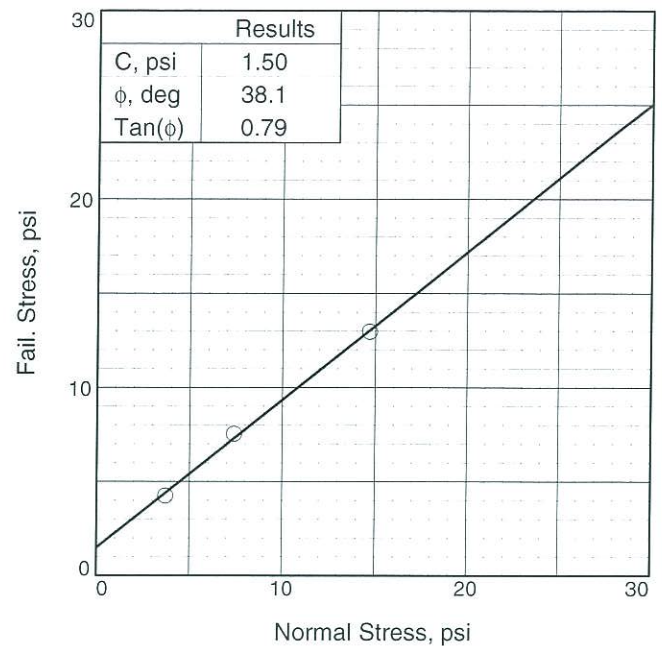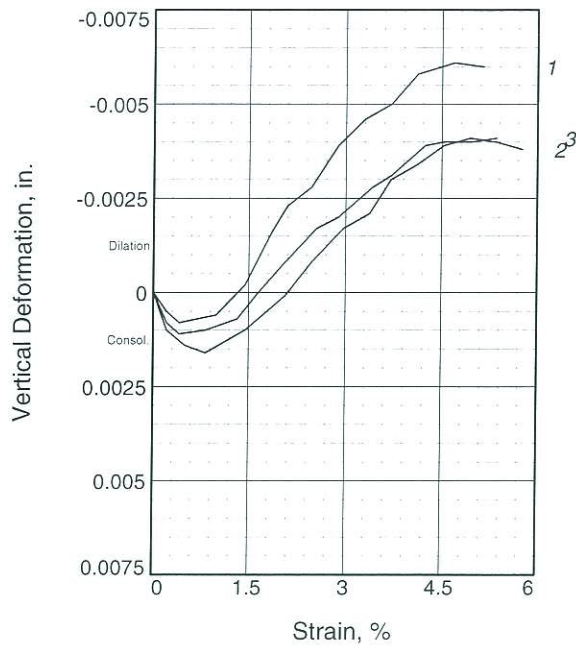
Sample No.		1	2	3
Initial	Water Content, %	11.7	12.1	11.8
	Dry Density, pcf	122.6	122.1	122.5
	Saturation, %	84.1	86.0	84.7
	Void Ratio	0.3744	0.3799	0.3762
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.2	12.8	12.6
	Dry Density, pcf	124.2	125.3	125.7
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.3568	0.3454	0.3404
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.97	0.97
Normal Stress, psi		3.70	7.40	14.70
Fail. Stress, psi		4.25	7.55	12.97
Strain, %		3.7	4.1	3.7
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0018R, S04
Sample Number: S36316   **Depth:** 15-16.3
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw _____   **Checked By:** mpw _____

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0018R, S04

Depth: 15-16.3   **Sample Number:**   S36316

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.100		2381.400
Moisture content: Dry soil+tare, gms.	2361.700		2361.700
Moisture content: Tare, gms.	2212.400		2212.400
Moisture, %	11.7	13.2	13.2
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	136.9	140.6	
Dry density, pcf	122.6	124.2	
Void ratio	0.3744	0.3568	
Saturation, %	84.1	99.9	

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 3.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 4.25 psi **at reading no.** 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	5.500	6.8	0.2	1.46	0.2995
2	0.0100	7.000	8.6	0.4	1.86	0.2992
3	0.0240	9.020	11.1	1.0	2.40	0.2994
4	0.0350	11.000	13.6	1.4	2.92	0.3002
5	0.0450	12.600	15.5	1.9	3.35	0.3016
6	0.0510	13.000	16.0	2.1	3.45	0.3023
7	0.0600	13.800	17.0	2.5	3.67	0.3028
8	0.0700	14.700	18.1	2.9	3.91	0.3039
9	0.0800	15.100	18.6	3.3	4.01	0.3046
10	0.0900	16.000	19.7	3.7	4.25	0.3050
11	0.1000	15.900	19.6	4.1	4.22	0.3058

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1140	14.500	17.9	4.7	3.85	0.3061
13	0.1250	13.000	16.0	5.1	3.45	0.3060

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.100		2380.100
Moisture content: Dry soil+tare, gms.	2361.100		2361.100
Moisture content: Tare, gms.	2212.400		2212.400
Moisture, %	12.1	12.8	12.8
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	136.9	141.3	
Dry density, pcf	122.1	125.3	
Void ratio	0.3799	0.3454	
Saturation, %	86.0	99.9	

Normal stress = 7.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 7.55 psi at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	9.600	9.6	0.2	2.07	0.2990
2	0.0120	15.000	15.0	0.5	3.23	0.2986
3	0.0200	19.100	19.1	0.8	4.12	0.2984
4	0.0350	25.500	25.5	1.4	5.50	0.2990
5	0.0400	26.900	26.9	1.6	5.80	0.2993
6	0.0500	29.200	29.2	2.1	6.30	0.2999
7	0.0600	31.900	31.9	2.5	6.88	0.3008
8	0.0720	33.100	33.1	3.0	7.14	0.3017
9	0.0820	34.000	34.0	3.4	7.33	0.3021
10	0.0900	34.800	34.8	3.7	7.50	0.3030
11	0.1000	35.000	35.0	4.1	7.55	0.3034
12	0.1100	34.800	34.8	4.5	7.50	0.3039
13	0.1200	33.000	33.0	4.9	7.12	0.3041
14	0.1300	31.200	31.2	5.3	6.73	0.3040
15	0.1400	29.400	29.4	5.8	6.34	0.3038

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.200		2380.400
Moisture content: Dry soil+tare, gms.	2361.600		2361.600
Moisture content: Tare, gms.	2212.500		2212.500
Moisture, %	11.8	12.6	12.6
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	136.9	141.6	
Dry density, pcf	122.5	125.7	
Void ratio	0.3762	0.3404	
Saturation, %	84.7	100.0	

Load ring constant = .8988 lbs. per input unit

Normal stress = 14.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 12.97 psi at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	15.100	13.6	0.2	2.93	0.2992
2	0.0100	26.000	23.4	0.4	5.04	0.2989
3	0.0200	43.200	38.8	0.8	8.37	0.2990
4	0.0320	53.000	47.6	1.3	10.27	0.2993
5	0.0400	56.100	50.4	1.6	10.87	0.3000
6	0.0500	59.000	53.0	2.1	11.43	0.3008
7	0.0620	62.400	56.1	2.6	12.09	0.3017
8	0.0700	64.000	57.5	2.9	12.40	0.3020
9	0.0830	65.800	59.1	3.4	12.75	0.3028
10	0.0900	66.900	60.1	3.7	12.97	0.3031
11	0.1030	66.000	59.3	4.2	12.79	0.3039
12	0.1100	66.000	59.3	4.5	12.79	0.3040
13	0.1200	65.200	58.6	4.9	12.64	0.3040
14	0.1300	64.800	58.2	5.3	12.56	0.3041

Results	
C, psi	0.81
φ, deg	41.1
Tan(φ)	0.87
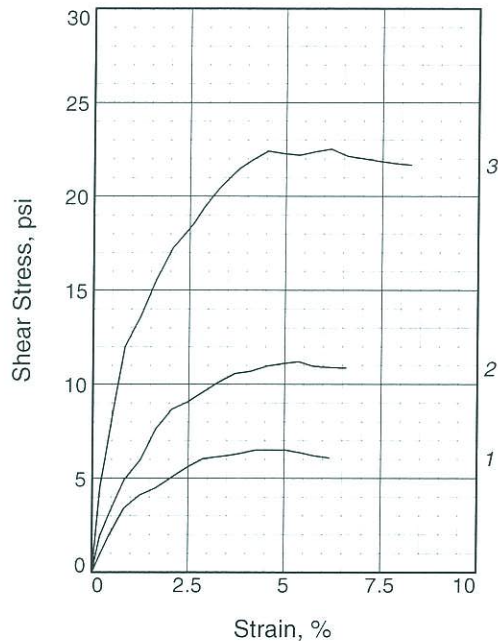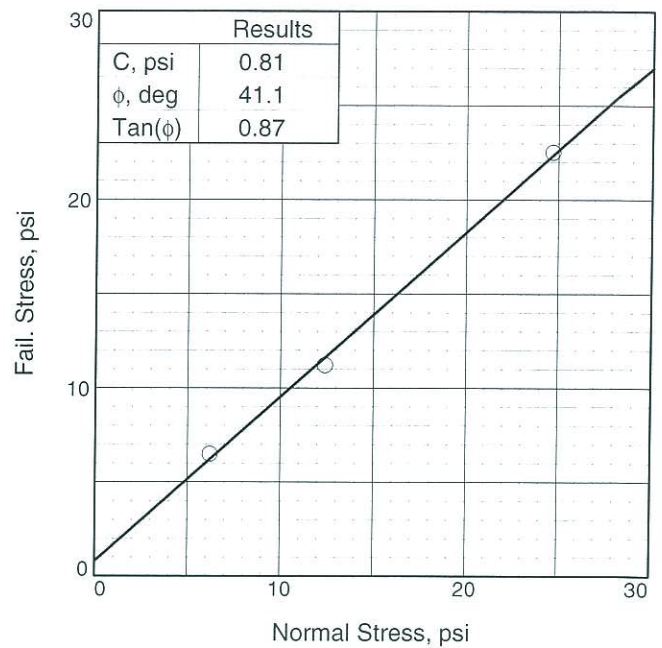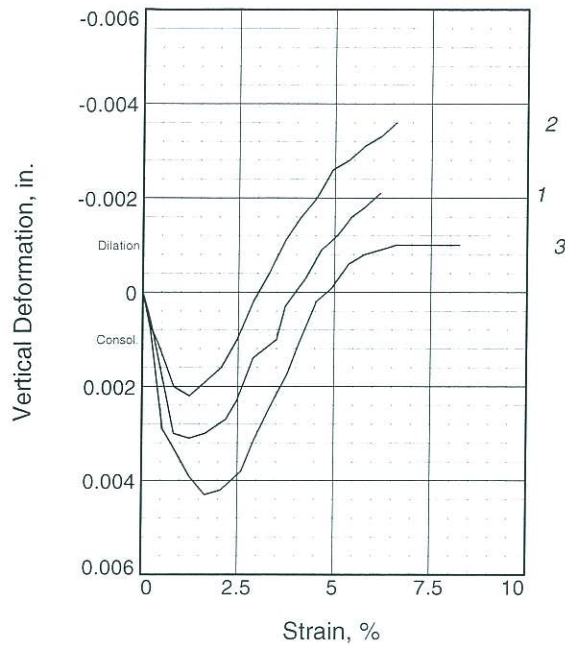
Sample No.		1	2	3
Initial	Water Content, %	20.2	20.0	19.8
	Dry Density, pcf	107.3	107.4	107.6
	Saturation, %	95.6	95.1	94.6
	Void Ratio	0.5712	0.5688	0.5664
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.2	19.2	18.1
	Dry Density, pcf	111.0	111.0	113.3
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.5179	0.5189	0.4881
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.97	0.97	0.95
Normal Stress, psi		6.20	12.40	24.70
Fail. Stress, psi		6.51	11.21	22.53
Strain, %		4.7	5.3	6.2
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0018R, S06
Sample Number: S36317   **Depth:** 25-26.2
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

Fresno to Bakersfield Geotech Investigation

#SA-HST019

Project No.:   11-111

Location: S0018R, S06

Depth: 25-26.2   **Sample Number:**   S36317

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2353.300		2351.950
Moisture content: Dry soil+tare, gms.	2326.900		2326.900
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	20.2	19.2	19.2
Moist specimen weight, gms.	157.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	129.0	132.3	
Dry density, pcf	107.3	111.0	
Void ratio	0.5712	0.5179	
Saturation, %	95.6	100.0	

Test Readings for Specimen No. 1

Normal stress = 6.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 6.51 psi **at reading no.** 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.300	4.3	0.2	0.93	0.2994
2	0.0100	8.700	8.7	0.4	1.88	0.2986
3	0.0200	15.800	15.8	0.8	3.41	0.2970
4	0.0300	19.100	19.1	1.2	4.12	0.2969
5	0.0400	20.800	20.8	1.6	4.48	0.2970
6	0.0530	24.200	24.2	2.2	5.22	0.2973
7	0.0600	25.900	25.9	2.5	5.58	0.2977
8	0.0700	28.100	28.1	2.9	6.06	0.2986
9	0.0850	28.800	28.8	3.5	6.21	0.2990
10	0.0900	29.100	29.1	3.7	6.27	0.2997
11	0.1030	30.100	30.1	4.2	6.49	0.3003
12	0.1130	30.200	30.2	4.7	6.51	0.3009

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1230	30.100	30.1	5.1	6.49	0.3012
14	0.1320	29.500	29.5	5.4	6.36	0.3016
15	0.1400	28.800	28.8	5.8	6.21	0.3018
16	0.1500	28.200	28.2	6.2	6.08	0.3021

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2369.100		2368.000
Moisture content: Dry soil+tare, gms.	2342.900		2342.900
Moisture content: Tare, gms.	2212.100		2212.100
Moisture, %	20.0	19.2	19.2
Moist specimen weight, gms.	157.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	129.0	132.3	
Dry density, pcf	107.4	111.0	
Void ratio	0.5688	0.5189	
Saturation, %	95.1	99.9	

Normal stress = 12.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 11.21 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	9.000	9.0	0.2	1.94	0.2993
2	0.0100	14.000	14.0	0.4	3.02	0.2989
3	0.0200	22.800	22.8	0.8	4.92	0.2980
4	0.0300	27.600	27.6	1.2	5.95	0.2978
5	0.0400	35.400	35.4	1.6	7.63	0.2981
6	0.0500	40.200	40.2	2.1	8.67	0.2984
7	0.0600	42.000	42.0	2.5	9.06	0.2990
8	0.0700	44.600	44.6	2.9	9.62	0.2998
9	0.0800	47.000	47.0	3.3	10.13	0.3004
10	0.0900	49.100	49.1	3.7	10.59	0.3011
11	0.1000	49.600	49.6	4.1	10.69	0.3016
12	0.1100	50.900	50.9	4.5	10.98	0.3020
13	0.1200	51.500	51.5	4.9	11.10	0.3026
14	0.1300	52.000	52.0	5.3	11.21	0.3028
15	0.1400	50.800	50.8	5.8	10.95	0.3031
16	0.1500	50.600	50.6	6.2	10.91	0.3033
17	0.1600	50.400	50.4	6.6	10.87	0.3036

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2369.600		2367.250
Moisture content: Dry soil+tare, gms.	2343.600		2343.600
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	19.8	18.1	18.1
Moist specimen weight, gms.	157.0		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	129.0	133.7	
Dry density, pcf	107.6	113.3	
Void ratio	0.5664	0.4881	
Saturation, %	94.6	99.9	

Normal stress = 24.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 22.53 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	21.200	21.2	0.2	4.57	0.2992
2	0.0130	40.000	40.0	0.5	8.62	0.2971
3	0.0200	55.600	55.6	0.8	11.99	0.2967
4	0.0300	63.200	63.2	1.2	13.63	0.2961
5	0.0400	72.400	72.4	1.6	15.61	0.2957
6	0.0500	80.000	80.0	2.1	17.25	0.2958
7	0.0630	86.000	86.0	2.6	18.54	0.2962
8	0.0700	90.300	90.3	2.9	19.47	0.2968
9	0.0800	95.100	95.1	3.3	20.51	0.2975
10	0.0920	99.700	99.7	3.8	21.50	0.2983
11	0.1000	101.700	101.7	4.1	21.93	0.2990
12	0.1100	104.000	104.0	4.5	22.42	0.2998
13	0.1200	103.400	103.4	4.9	22.30	0.3001
14	0.1300	103.000	103.0	5.3	22.21	0.3006
15	0.1400	103.800	103.8	5.8	22.38	0.3008
16	0.1500	104.500	104.5	6.2	22.53	0.3009
17	0.1600	102.700	102.7	6.6	22.14	0.3010
18	0.1700	102.100	102.1	7.0	22.02	0.3010
19	0.1800	101.500	101.5	7.4	21.89	0.3010
20	0.1900	100.900	100.9	7.8	21.76	0.3010
21	0.2000	100.500	100.5	8.2	21.67	0.3010

Results

C, psi	3.70
φ, deg	37.3
Tan(φ)	0.76
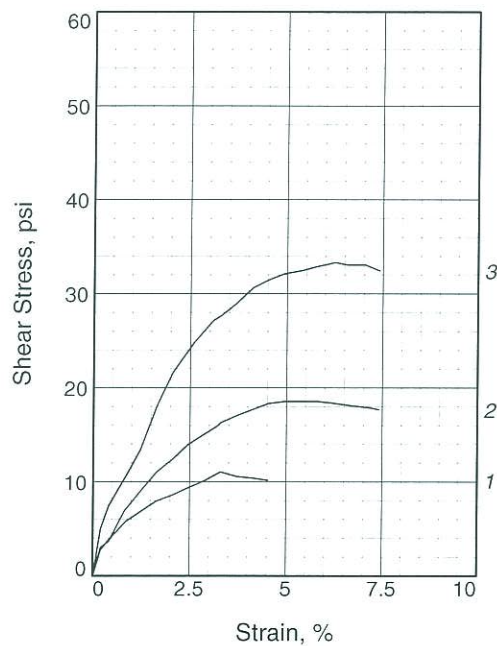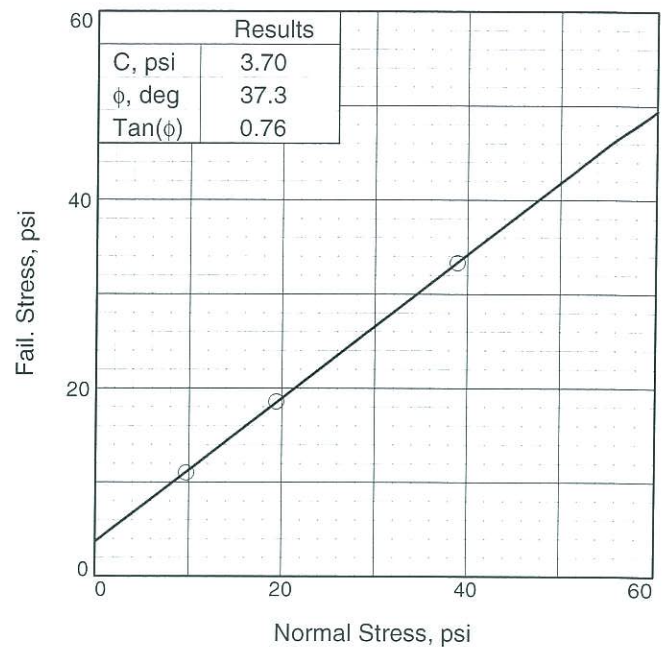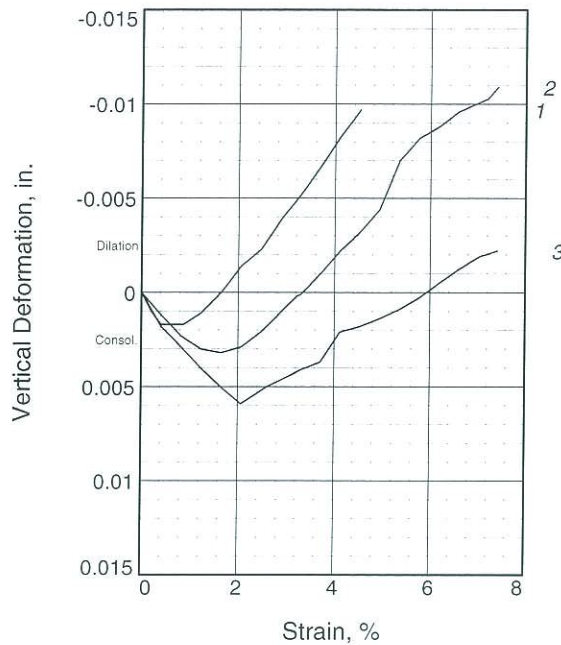
Sample No.		1	2	3
Initial	Water Content, %	19.6	19.5	19.8
	Dry Density, pcf	108.7	108.8	108.4
	Saturation, %	95.9	95.7	96.6
	Void Ratio	0.5510	0.5498	0.5545
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.5	18.6	19.0
	Dry Density, pcf	110.5	112.1	111.3
	Saturation, %	99.9	99.9	99.9
	Void Ratio	0.5259	0.5033	0.5138
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.97	0.97
Normal Stress, psi		9.70	19.40	38.90
Fail. Stress, psi		11.04	18.59	33.33
Strain, %		3.3	5.8	6.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
 Fresno to Bakersfield Geotech Investigation
Location: S0018R, S09
Sample Number: S36318   **Depth:** 40-41.1
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: cw   **Checked By:** CPW

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0018R, S09

Depth: 40-41.1   **Sample Number:**   S36318

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2355.000		2354.850
Moisture content: Dry soil+tare, gms.	2329.100		2329.100
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	19.6	19.5	19.5
Moist specimen weight, gms.	158.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	130.0	132.0	
Dry density, pcf	108.7	110.5	
Void ratio	0.5510	0.5259	
Saturation, %	95.9	99.9	

Normal stress = 9.7 psi

Strain rate, in./min. = 0.03

Fail. Stress = 11.04 psi **at reading no.** 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	12.700	12.7	0.2	2.74	0.2990
2	0.0100	17.800	17.8	0.4	3.84	0.2983
3	0.0210	27.000	27.0	0.9	5.82	0.2983
4	0.0300	31.700	31.7	1.2	6.84	0.2989
5	0.0400	36.800	36.8	1.6	7.93	0.3000
6	0.0500	39.900	39.9	2.1	8.60	0.3014
7	0.0600	43.500	43.5	2.5	9.38	0.3023
8	0.0700	47.000	47.0	2.9	10.13	0.3039
9	0.0800	51.200	51.2	3.3	11.04	0.3052
10	0.0900	49.000	49.0	3.7	10.57	0.3067
11	0.1000	48.200	48.2	4.1	10.39	0.3083
12	0.1100	47.100	47.1	4.5	10.16	0.3097

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2370.200		2369.050
Moisture content: Dry soil+tare, gms.	2344.400		2344.400
Moisture content: Tare, gms.	2212.000		2212.000
Moisture, %	19.5	18.6	18.6
Moist specimen weight, gms.	158.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	130.0	133.0	
Dry density, pcf	108.8	112.1	
Void ratio	0.5498	0.5033	
Saturation, %	95.7	99.9	

Normal stress = 19.4 psi

Strain rate, in./min. = 0.03

Fail. Stress = 18.59 psi at reading no. 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	13.900	13.9	0.2	3.00	0.2994
2	0.0100	17.000	17.0	0.4	3.67	0.2988
3	0.0200	32.100	32.1	0.8	6.92	0.2977
4	0.0300	41.800	41.8	1.2	9.01	0.2970
5	0.0400	51.100	51.1	1.6	11.02	0.2968
6	0.0500	57.500	57.5	2.1	12.40	0.2971
7	0.0600	65.000	65.0	2.5	14.02	0.2979
8	0.0780	73.900	73.9	3.2	15.93	0.2998
9	0.0800	75.500	75.5	3.3	16.28	0.2999
10	0.0900	79.100	79.1	3.7	17.06	0.3010
11	0.1000	82.100	82.1	4.1	17.70	0.3022
12	0.1100	85.000	85.0	4.5	18.33	0.3032
13	0.1200	85.900	85.9	4.9	18.52	0.3044
14	0.1300	86.000	86.0	5.3	18.54	0.3070
15	0.1400	86.200	86.2	5.8	18.59	0.3082
16	0.1500	85.400	85.4	6.2	18.41	0.3088
17	0.1600	84.300	84.3	6.6	18.18	0.3096
18	0.1750	82.800	82.8	7.2	17.85	0.3103
19	0.1800	82.100	82.1	7.4	17.70	0.3109

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2354.700		2353.600
Moisture content: Dry soil+tare, gms.	2328.500		2328.500
Moisture content: Tare, gms.	2196.500		2196.500
Moisture, %	19.8	19.0	19.0
Moist specimen weight, gms.	158.2		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	130.0	132.5	
Dry density, pcf	108.4	111.3	
Void ratio	0.5545	0.5138	
Saturation, %	96.6	99.9	

Load ring constant = .8988 lbs. per input unit
Normal stress = 38.9 psi
Strain rate, in./min. = 0.03
Fail. Stress = 33.33 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	25.800	23.2	0.2	5.00	0.2991
2	0.0100	38.600	34.7	0.4	7.48	0.2982
3	0.0210	55.000	49.4	0.9	10.66	0.2970
4	0.0300	69.400	62.4	1.2	13.45	0.2960
5	0.0400	93.100	83.7	1.6	18.04	0.2950
6	0.0500	111.800	100.5	2.1	21.67	0.2941
7	0.0630	128.000	115.0	2.6	24.81	0.2950
8	0.0750	140.000	125.8	3.1	27.13	0.2956
9	0.0800	142.900	128.4	3.3	27.69	0.2959
10	0.0900	150.000	134.8	3.7	29.07	0.2963
11	0.1000	158.200	142.2	4.1	30.66	0.2979
12	0.1100	162.600	146.1	4.5	31.51	0.2982
13	0.1200	165.900	149.1	4.9	32.15	0.2986
14	0.1300	167.500	150.5	5.3	32.46	0.2991
15	0.1400	169.800	152.6	5.8	32.91	0.2997
16	0.1520	172.000	154.6	6.3	33.33	0.3006
17	0.1600	170.700	153.4	6.6	33.08	0.3012
18	0.1710	170.600	153.3	7.0	33.06	0.3019
19	0.1800	167.500	150.5	7.4	32.46	0.3022

	Results	
C, psi	7.50	
φ, deg	35.1	
Tan(φ)	0.70	
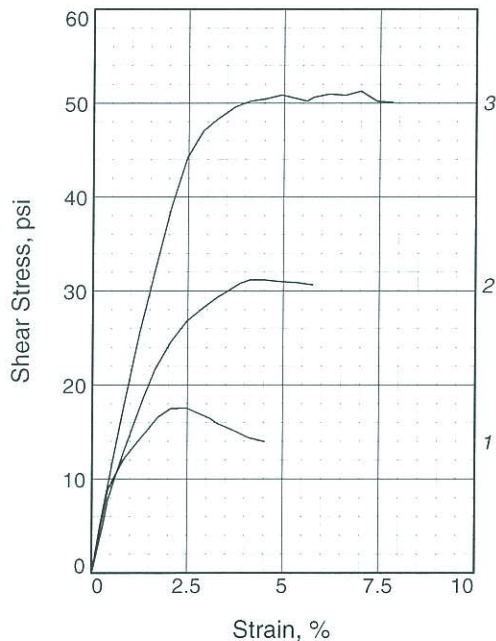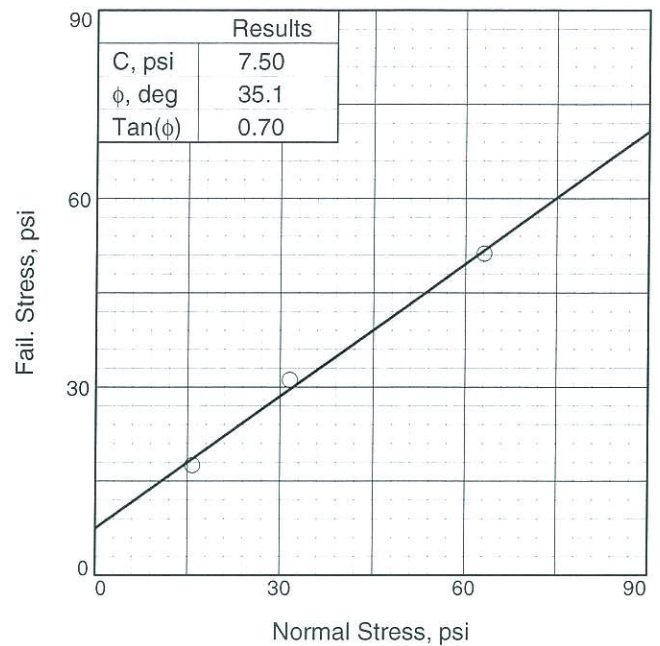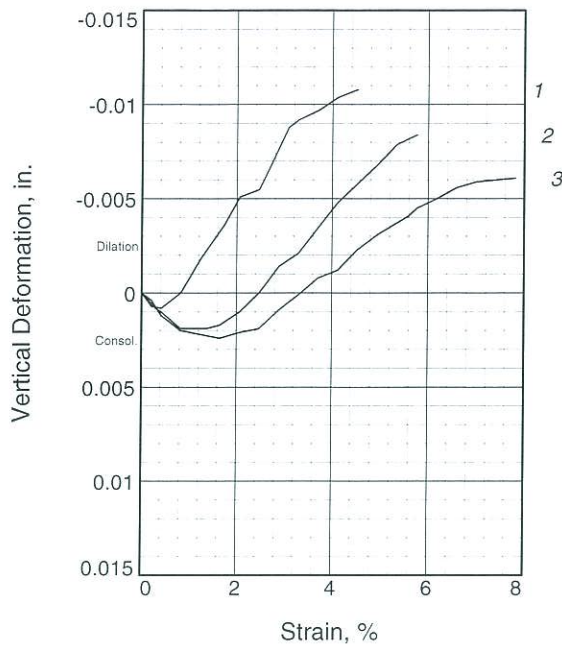
Sample No.		1	2	3
Initial	Water Content, %	13.0	12.9	12.6
	Dry Density, pcf	121.2	121.2	121.6
	Saturation, %	89.9	89.5	88.3
	Void Ratio	0.3912	0.3902	0.3865
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.5	13.4	12.7
	Dry Density, pcf	123.5	123.7	125.6
	Saturation, %	99.9	99.9	100.0
	Void Ratio	0.3647	0.3621	0.3419
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.98	0.98	0.97
Normal Stress, psi		15.80	31.50	63.10
Fail. Stress, psi		17.55	31.16	51.28
Strain, %		2.5	4.1	7.0
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0018R, S14
Sample Number: S36319   **Depth:** 65-65.7
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

                         Fresno to Bakersfield Geotech Investigation

                         #SA-HST019

Project No.:   11-111

Location: S0018R, S14

Depth: 65-65.7   **Sample Number:**   S36319

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2380.000
Moisture content: Dry soil+tare, gms.	2360.100		2360.100
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	13.0	13.5	13.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	136.9	140.2	
Dry density, pcf	121.2	123.5	
Void ratio	0.3912	0.3647	
Saturation, %	89.9	99.9	

Normal stress = 15.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 17.55 psi **at reading no.** 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	20.600	20.6	0.2	4.44	0.2993
2	0.0100	41.200	41.2	0.4	8.88	0.2992
3	0.0200	56.200	56.2	0.8	12.12	0.3000
4	0.0300	65.800	65.8	1.2	14.19	0.3018
5	0.0420	77.000	77.0	1.7	16.60	0.3036
6	0.0500	81.000	81.0	2.1	17.47	0.3051
7	0.0600	81.400	81.4	2.5	17.55	0.3055
8	0.0750	76.300	76.3	3.1	16.45	0.3088
9	0.0800	73.600	73.6	3.3	15.87	0.3092
10	0.0900	70.400	70.4	3.7	15.18	0.3097
11	0.1000	66.700	66.7	4.1	14.38	0.3104
12	0.1100	64.800	64.8	4.5	13.97	0.3108

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.300		2364.200
Moisture content: Dry soil+tare, gms.	2344.200		2344.400
Moisture content: Tare, gms.	2196.600		2196.600
Moisture, %	12.9	13.4	13.4
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	136.9	140.3	
Dry density, pcf	121.2	123.7	
Void ratio	0.3902	0.3621	
Saturation, %	89.5	99.9	

Normal stress = 31.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 31.16 psi at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0070	23.400	23.4	0.3	5.05	0.2992
2	0.0100	36.200	36.2	0.4	7.81	0.2990
3	0.0200	59.800	59.8	0.8	12.89	0.2981
4	0.0330	87.500	87.5	1.4	18.87	0.2981
5	0.0400	100.600	100.6	1.6	21.69	0.2983
6	0.0500	114.000	114.0	2.1	24.58	0.2990
7	0.0600	124.100	124.1	2.5	26.76	0.3000
8	0.0700	130.700	130.7	2.9	28.18	0.3014
9	0.0800	136.400	136.4	3.3	29.41	0.3021
10	0.0940	142.900	142.9	3.9	30.81	0.3040
11	0.1000	144.500	144.5	4.1	31.16	0.3048
12	0.1100	144.500	144.5	4.5	31.16	0.3058
13	0.1200	143.800	143.8	4.9	31.01	0.3068
14	0.1300	143.300	143.3	5.3	30.90	0.3079
15	0.1400	142.100	142.1	5.8	30.64	0.3084

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2379.350
Moisture content: Dry soil+tare, gms.	2360.600		2360.600
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	12.6	12.7	12.7
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	136.9	141.5	
Dry density, pcf	121.6	125.6	
Void ratio	0.3865	0.3419	
Saturation, %	88.3	100.0	

Normal stress = 63.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 51.28 psi at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	22.500	22.5	0.2	4.85	0.2996
2	0.0100	43.400	43.4	0.4	9.36	0.2988
3	0.0200	82.400	82.4	0.8	17.77	0.2980
4	0.0300	118.700	118.7	1.2	25.59	0.2978
5	0.0400	150.100	150.1	1.6	32.37	0.2976
6	0.0500	180.500	180.5	2.1	38.92	0.2979
7	0.0600	205.000	205.0	2.5	44.20	0.2981
8	0.0700	218.200	218.2	2.9	47.05	0.2991
9	0.0800	224.500	224.5	3.3	48.41	0.2999
10	0.0900	230.000	230.0	3.7	49.59	0.3008
11	0.1000	233.000	233.0	4.1	50.24	0.3012
12	0.1100	234.100	234.1	4.5	50.48	0.3023
13	0.1200	236.000	236.0	4.9	50.89	0.3031
14	0.1360	233.000	233.0	5.6	50.24	0.3041
15	0.1400	234.900	234.9	5.8	50.65	0.3045
16	0.1500	236.400	236.4	6.2	50.97	0.3050
17	0.1600	235.800	235.8	6.6	50.84	0.3056
18	0.1700	237.800	237.8	7.0	51.28	0.3059
19	0.1800	232.900	232.9	7.4	50.22	0.3060
20	0.1900	232.300	232.3	7.8	50.09	0.3061

Results	
C, psi	1.55
φ, deg	40.9
Tan(φ)	0.87
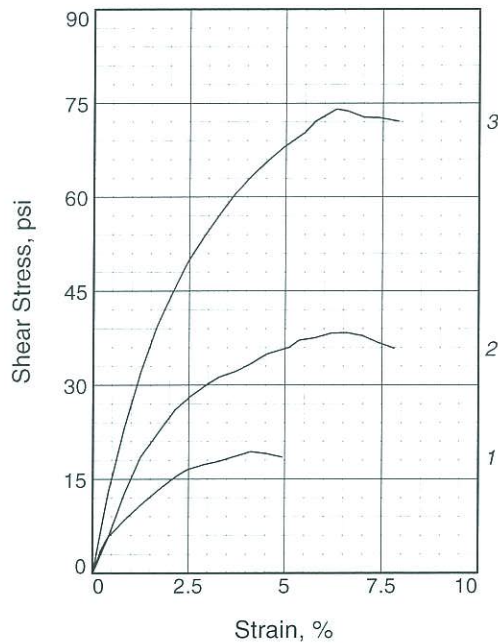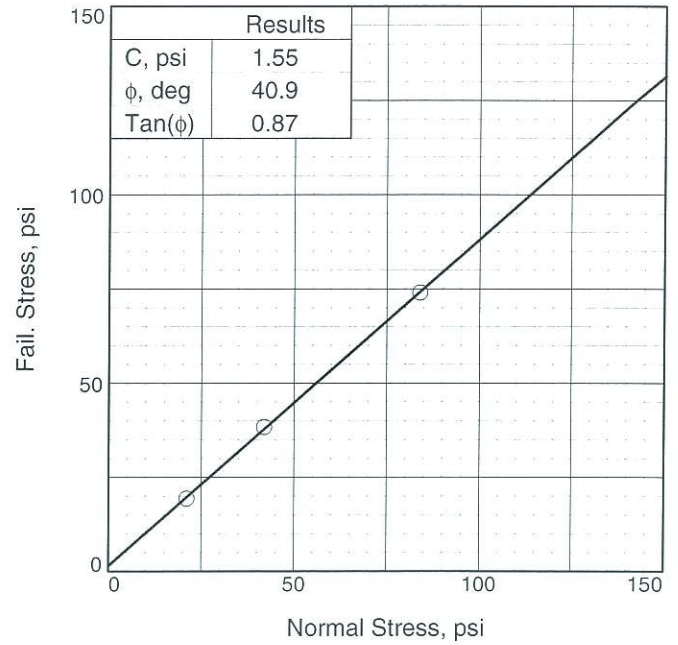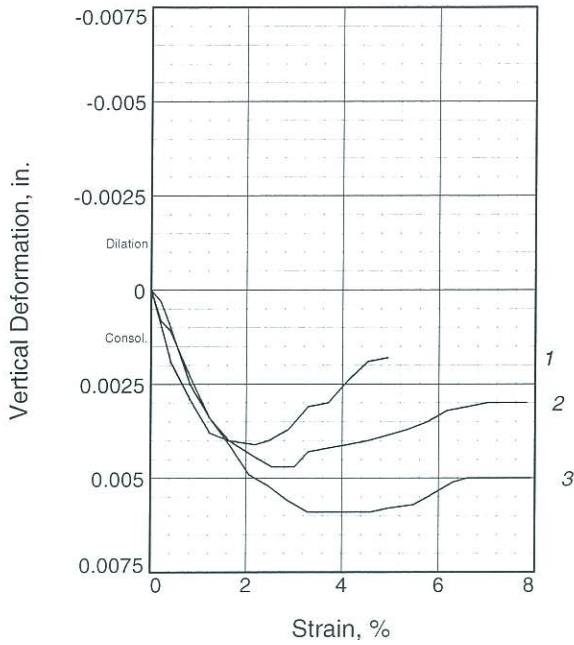
Sample No.		1	2	3
Initial	Water Content, %	15.4	15.5	15.6
	Dry Density, pcf	117.8	117.7	117.6
	Saturation, %	96.6	97.0	97.1
	Void Ratio	0.4309	0.4324	0.4329
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	13.8	13.5	12.0
	Dry Density, pcf	122.7	123.6	127.3
	Saturation, %	100.0	100.0	99.9
	Void Ratio	0.3734	0.3638	0.3240
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.96	0.95	0.92
Normal Stress, psi		21.00	41.90	83.90
Fail. Stress, psi		19.41	38.36	74.07
Strain, %		4.1	6.6	6.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
    Fresno to Bakersfield Geotech Investigation
Location: S0018R, S18
Sample Number: S36321   **Depth:** 85-86.4
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0018R, S18
Depth: 85-86.4   **Sample Number:**   S36321
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2362.100		2359.800
Moisture content: Dry soil+tare, gms.	2340.000		2340.000
Moisture content: Tare, gms.	2196.600		2196.800
Moisture, %	15.4	13.8	13.8
Moist specimen weight, gms.	165.5		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet density, pcf	135.9	139.7	
Dry density, pcf	117.8	122.7	
Void ratio	0.4309	0.3734	
Saturation, %	96.6	100.0	

Normal stress = 21.0 psi
Strain rate, in./min. = 0.03
Fail. Stress = 19.41 psi **at reading no.** 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	13.200	13.2	0.2	2.85	0.2991
2	0.0100	26.800	26.8	0.4	5.78	0.2981
3	0.0200	39.100	39.1	0.8	8.43	0.2971
4	0.0300	50.000	50.0	1.2	10.78	0.2962
5	0.0400	60.000	60.0	1.6	12.94	0.2960
6	0.0530	71.900	71.9	2.2	15.50	0.2959
7	0.0600	76.600	76.6	2.5	16.52	0.2960
8	0.0700	80.200	80.2	2.9	17.29	0.2963
9	0.0800	82.900	82.9	3.3	17.88	0.2969
10	0.0900	86.400	86.4	3.7	18.63	0.2970
11	0.1000	90.000	90.0	4.1	19.41	0.2976
12	0.1100	88.400	88.4	4.5	19.06	0.2981

Sierra Testing Labs, Inc.

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	85.900	85.9	4.9	18.52	0.2982

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2352.000		2349.230
Moisture content: Dry soil+tare, gms.	2331.100		2331.100
Moisture content: Tare, gms.	2196.500		2196.500
Moisture, %	15.5	13.5	13.5
Moist specimen weight, gms.	165.5		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	135.9	140.2	
Dry density, pcf	117.7	123.6	
Void ratio	0.4324	0.3638	
Saturation, %	97.0	100.0	

Normal stress = 41.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 38.36 psi at reading no. 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	16.300	16.3	0.2	3.51	0.2997
2	0.0100	27.200	27.2	0.4	5.86	0.2990
3	0.0200	58.900	58.9	0.8	12.70	0.2975
4	0.0300	85.600	85.6	1.2	18.46	0.2966
5	0.0400	101.800	101.8	1.6	21.95	0.2960
6	0.0520	121.000	121.0	2.1	26.09	0.2956
7	0.0620	131.100	131.1	2.6	28.27	0.2953
8	0.0730	140.100	140.1	3.0	30.21	0.2953
9	0.0800	145.100	145.1	3.3	31.29	0.2957
10	0.0900	149.200	149.2	3.7	32.17	0.2958
11	0.1000	155.100	155.1	4.1	33.44	0.2959
12	0.1100	162.100	162.1	4.5	34.95	0.2960
13	0.1240	167.000	167.0	5.1	36.01	0.2962
14	0.1300	172.400	172.4	5.3	37.17	0.2963
15	0.1400	174.200	174.2	5.8	37.56	0.2965
16	0.1500	177.400	177.4	6.2	38.25	0.2968
17	0.1600	177.900	177.9	6.6	38.36	0.2969
18	0.1700	175.600	175.6	7.0	37.86	0.2970
19	0.1800	170.400	170.4	7.4	36.74	0.2970
20	0.1900	166.300	166.3	7.8	35.86	0.2970

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2378.100		2372.970
Moisture content: Dry soil+tare, gms.	2355.800		2355.800
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	15.6	12.0	12.0
Moist specimen weight, gms.	165.5		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.92	
Net decrease in height, in.		0.08	
Wet density, pcf	135.9	142.6	
Dry density, pcf	117.6	127.3	
Void ratio	0.4329	0.3240	
Saturation, %	97.1	99.9	

Normal stress = 83.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 74.07 psi at reading no. 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	30.000	30.0	0.2	6.47	0.2992
2	0.0100	61.000	61.0	0.4	13.15	0.2989
3	0.0200	108.100	108.1	0.8	23.31	0.2977
4	0.0300	148.200	148.2	1.2	31.96	0.2966
5	0.0400	181.500	181.5	1.6	39.14	0.2959
6	0.0500	207.100	207.1	2.1	44.66	0.2951
7	0.0600	230.800	230.8	2.5	49.77	0.2948
8	0.0700	249.100	249.1	2.9	53.71	0.2944
9	0.0800	265.600	265.6	3.3	57.27	0.2941
10	0.0900	281.100	281.1	3.7	60.61	0.2941
11	0.1000	294.100	294.1	4.1	63.42	0.2941
12	0.1110	306.000	306.0	4.6	65.98	0.2941
13	0.1200	315.000	315.0	4.9	67.92	0.2942
14	0.1330	326.000	326.0	5.5	70.29	0.2943
15	0.1400	334.800	334.8	5.8	72.19	0.2945
16	0.1530	343.500	343.5	6.3	74.07	0.2949
17	0.1600	342.100	342.1	6.6	73.77	0.2950
18	0.1700	337.500	337.5	7.0	72.77	0.2950
19	0.1800	337.100	337.1	7.4	72.69	0.2950
20	0.1920	334.500	334.5	7.9	72.13	0.2950

Results	
C, psi	7.50
φ, deg	32.6
Tan(φ)	0.64
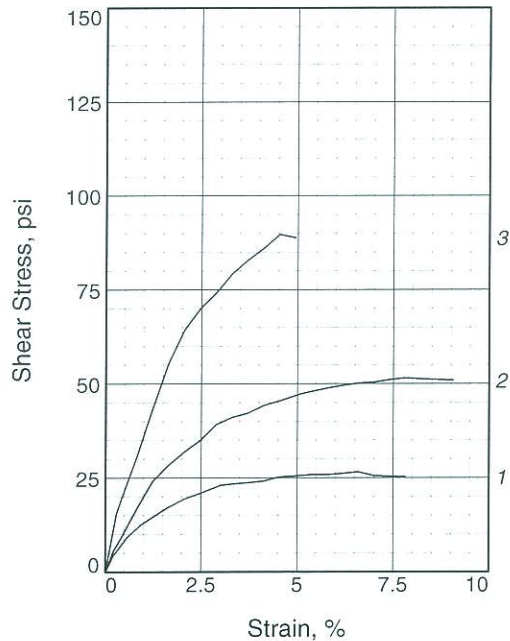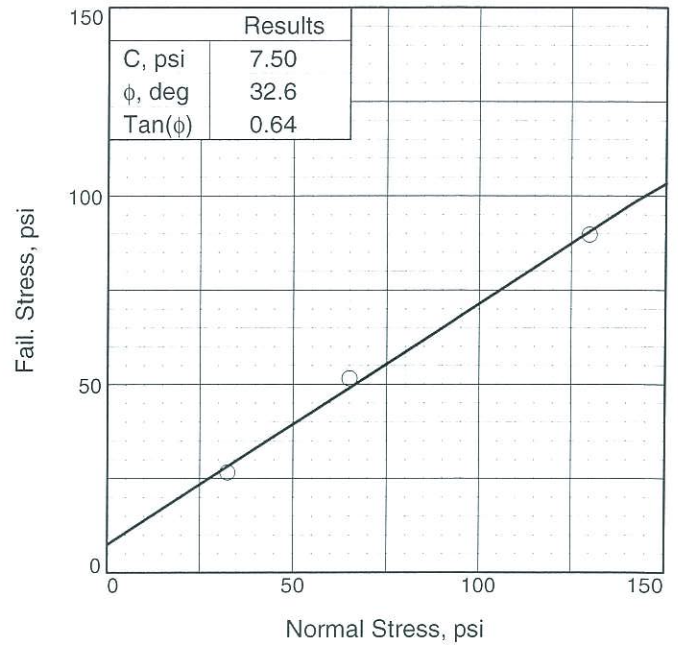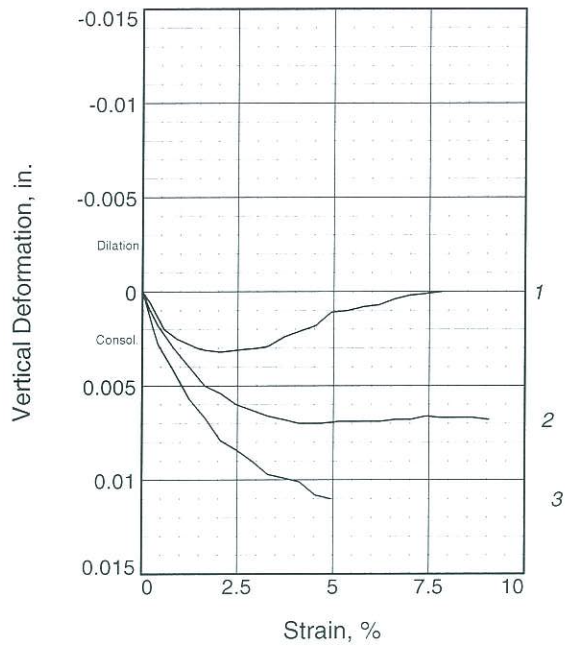
Sample No.		1	2	3
Initial	Water Content, %	17.1	17.0	17.2
	Dry Density, pcf	113.5	113.6	113.4
	Saturation, %	95.1	95.0	95.6
	Void Ratio	0.4848	0.4842	0.4869
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	15.3	14.6	14.0
	Dry Density, pcf	119.2	120.8	122.2
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.4135	0.3951	0.3788
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.95	0.94	0.93
Normal Stress, psi		32.50	65.00	130.00
Fail. Stress, psi		26.61	51.56	89.76
Strain, %		6.6	7.8	4.5
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
 Fresno to Bakersfield Geotech Investigation
Location: S0018R, S27
Sample Number: S36323   **Depth:** 130-130.9
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train

                         Fresno to Bakersfield Geotech Investigation

                         #SA-HST019

Project No.:   11-111

Location: S0018R, S27

Depth: 130-130.9   **Sample Number:**   S36323

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2374.400		2371.950
Moisture content: Dry soil+tare, gms.	2350.800		2350.800
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	17.1	15.3	15.3
Moist specimen weight, gms.	161.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.05	
Wet density, pcf	132.9	137.5	
Dry density, pcf	113.5	119.2	
Void ratio	0.4848	0.4135	
Saturation, %	95.1	99.9	

Normal stress = 32.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 26.61 psi **at reading no.** 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	20.100	20.1	0.2	4.33	0.2994
2	0.0140	42.900	42.9	0.6	9.25	0.2980
3	0.0220	57.400	57.4	0.9	12.38	0.2975
4	0.0350	74.100	74.1	1.4	15.98	0.2970
5	0.0400	80.000	80.0	1.6	17.25	0.2969
6	0.0500	90.000	90.0	2.1	19.41	0.2968
7	0.0600	96.800	96.8	2.5	20.87	0.2969
8	0.0730	106.800	106.8	3.0	23.03	0.2970
9	0.0800	108.200	108.2	3.3	23.33	0.2971
10	0.0900	110.100	110.1	3.7	23.74	0.2976
11	0.1000	111.900	111.9	4.1	24.13	0.2979
12	0.1100	117.000	117.0	4.5	25.23	0.2982

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1200	118.400	118.4	4.9	25.53	0.2989
14	0.1300	120.000	120.0	5.3	25.87	0.2990
15	0.1400	119.800	119.8	5.8	25.83	0.2992
16	0.1500	121.200	121.2	6.2	26.13	0.2993
17	0.1600	123.400	123.4	6.6	26.61	0.2996
18	0.1700	118.700	118.7	7.0	25.59	0.2998
19	0.1800	117.700	117.7	7.4	25.38	0.2999
20	0.1900	117.100	117.1	7.8	25.25	0.3000

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2357.100		2353.800
Moisture content: Dry soil+tare, gms.	2333.700		2333.700
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	17.0	14.6	14.6
Moist specimen weight, gms.	161.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	132.9	138.5	
Dry density, pcf	113.6	120.8	
Void ratio	0.4842	0.3951	
Saturation, %	95.0	100.0	

Normal stress = 65 psi

Strain rate, in./min. = 0.03

Fail. Stress = 51.56 psi at reading no. 20

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	25.000	25.0	0.2	5.39	0.2990
2	0.0100	41.900	41.9	0.4	9.03	0.2982
3	0.0200	78.200	78.2	0.8	16.86	0.2970
4	0.0300	112.000	112.0	1.2	24.15	0.2960
5	0.0400	131.800	131.8	1.6	28.42	0.2950
6	0.0500	147.700	147.7	2.1	31.85	0.2946
7	0.0600	162.000	162.0	2.5	34.93	0.2940
8	0.0700	181.600	181.6	2.9	39.16	0.2937
9	0.0800	190.400	190.4	3.3	41.05	0.2934
10	0.0900	195.600	195.6	3.7	42.18	0.2932
11	0.1000	205.000	205.0	4.1	44.20	0.2930
12	0.1130	212.600	212.6	4.7	45.84	0.2930
13	0.1240	219.600	219.6	5.1	47.35	0.2931
14	0.1300	222.300	222.3	5.3	47.93	0.2931
15	0.1400	226.400	226.4	5.8	48.82	0.2931
16	0.1500	230.100	230.1	6.2	49.62	0.2931

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
17	0.1600	232.800	232.8	6.6	50.20	0.2932
18	0.1700	234.000	234.0	7.0	50.46	0.2932
19	0.1800	237.000	237.0	7.4	51.10	0.2934
20	0.1900	239.100	239.1	7.8	51.56	0.2933
21	0.2000	238.000	238.0	8.2	51.32	0.2933
22	0.2100	237.100	237.1	8.6	51.12	0.2933
23	0.2200	236.200	236.2	9.1	50.93	0.2932

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2374.400		2369.950
Moisture content: Dry soil+tare, gms.	2350.600		2350.600
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	17.2	14.0	14.0
Moist specimen weight, gms.	161.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.93	
Net decrease in height, in.		0.07	
Wet density, pcf	132.9	139.4	
Dry density, pcf	113.4	122.2	
Void ratio	0.4869	0.3788	
Saturation, %	95.6	99.9	

Normal stress = 130 psi

Strain rate, in./min. = 0.03

Fail. Stress = 89.76 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0070	71.500	71.5	0.3	15.42	0.2980
2	0.0100	89.100	89.1	0.4	19.21	0.2972
3	0.0200	142.900	142.9	0.8	30.81	0.2958
4	0.0300	202.100	202.1	1.2	43.58	0.2943
5	0.0400	257.500	257.5	1.6	55.52	0.2933
6	0.0500	298.000	298.0	2.1	64.26	0.2921
7	0.0600	324.600	324.6	2.5	69.99	0.2916
8	0.0700	344.400	344.4	2.9	74.26	0.2910
9	0.0800	367.800	367.8	3.3	79.31	0.2903
10	0.0900	384.800	384.8	3.7	82.97	0.2901
11	0.1000	399.400	399.4	4.1	86.12	0.2899
12	0.1100	416.300	416.3	4.5	89.76	0.2892
13	0.1200	412.400	412.4	4.9	88.92	0.2890

Results	
C, psi	5.81
φ, deg	32.2
Tan(φ)	0.63
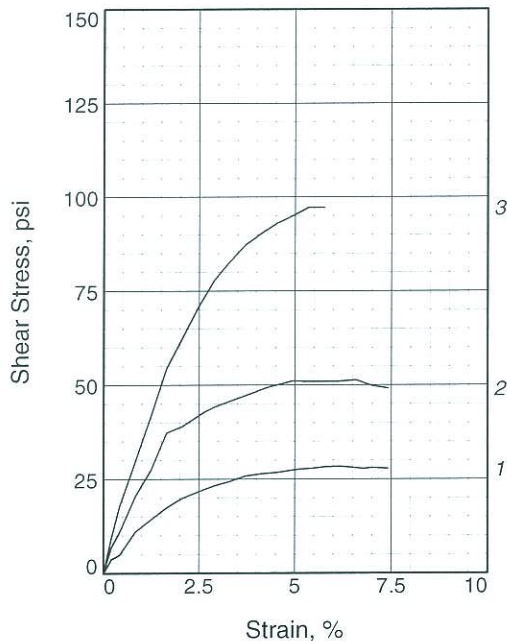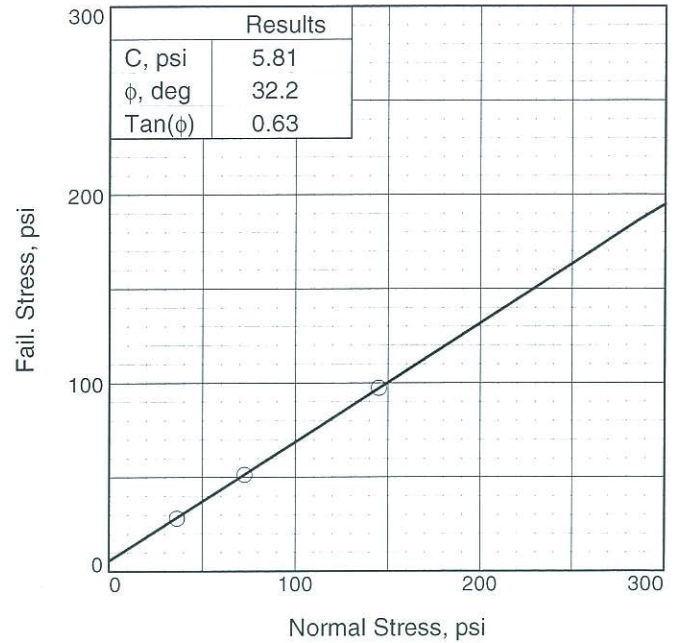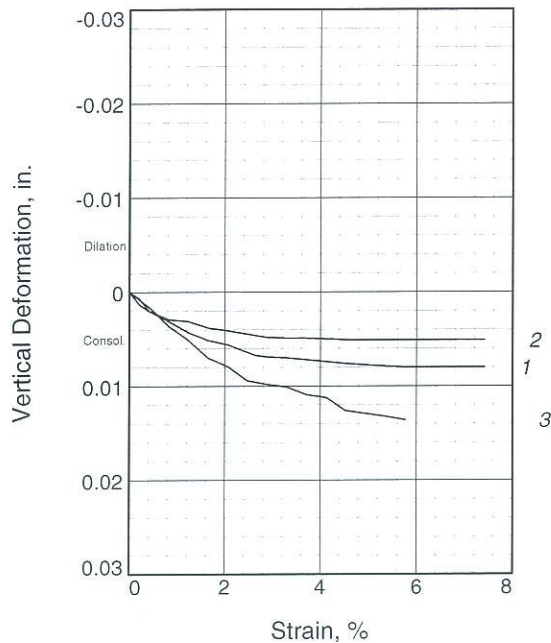
Sample No.		1	2	3
Initial	Water Content, %	14.9	14.6	14.8
	Dry Density, pcf	119.2	119.4	119.3
	Saturation, %	97.0	96.2	96.8
	Void Ratio	0.4142	0.4112	0.4132
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.2	11.5	10.6
	Dry Density, pcf	126.7	128.6	131.1
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.3307	0.3108	0.2859
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.94	0.93	0.91
Normal Stress, psi		36.30	72.50	145.00
Fail. Stress, psi		28.35	51.36	97.33
Strain, %		6.2	6.6	5.3
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
   Fresno to Bakersfield Geotech Investigation
Location: S0018R, S30
Sample Number: S36324   **Depth:** 145-146.0
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                     Fresno to Bakersfield Geotech Investigation
                     #SA-HST019
Project No.:   11-111
Location: S0018R, S30
Depth: 145-146.0   **Sample Number:**   S36324
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.000		2359.150
Moisture content: Dry soil+tare, gms.	2341.400		2341.400
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	14.9	12.2	12.2
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.94	
Net decrease in height, in.		0.06	
Wet density, pcf	136.9	142.2	
Dry density, pcf	119.2	126.7	
Void ratio	0.4142	0.3307	
Saturation, %	97.0	99.9	

Normal stress = 36.3 psi
Strain rate, in./min. = 0.03
Fail. Stress = 28.35 psi **at reading no.** 16

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	17.400	17.4	0.2	3.75	0.2987
2	0.0100	22.500	22.5	0.4	4.85	0.2980
3	0.0200	51.000	51.0	0.8	11.00	0.2969
4	0.0300	66.100	66.1	1.2	14.25	0.2957
5	0.0400	80.700	80.7	1.6	17.40	0.2949
6	0.0500	92.600	92.6	2.1	19.97	0.2944
7	0.0640	103.400	103.4	2.6	22.30	0.2933
8	0.0700	107.400	107.4	2.9	23.16	0.2931
9	0.0800	113.000	113.0	3.3	24.37	0.2930
10	0.0900	119.700	119.7	3.7	25.81	0.2928
11	0.1000	122.400	122.4	4.1	26.39	0.2926
12	0.1100	124.000	124.0	4.5	26.74	0.2924

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
13	0.1240	128.100	128.1	5.1	27.62	0.2922
14	0.1330	129.200	129.2	5.5	27.86	0.2921
15	0.1400	130.900	130.9	5.8	28.23	0.2920
16	0.1500	131.500	131.5	6.2	28.35	0.2920
17	0.1650	129.000	129.0	6.8	27.82	0.2920
18	0.1700	130.100	130.1	7.0	28.05	0.2920
19	0.1800	128.800	128.8	7.4	27.77	0.2920

| Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2379.300		2374.740
Moisture content: Dry soil+tare, gms.	2358.000		2358.000
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	14.6	11.5	11.5
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.93	
Net decrease in height, in.		0.07	
Wet density, pcf	136.9	143.4	
Dry density, pcf	119.4	128.6	
Void ratio	0.4112	0.3108	
Saturation, %	96.2	100.0	

Normal stress = 72.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 51.36 psi at reading no. 17

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	32.200	32.2	0.2	6.94	0.2993
2	0.0100	50.400	50.4	0.4	10.87	0.2980
3	0.0200	94.800	94.8	0.8	20.44	0.2971
4	0.0300	127.200	127.2	1.2	27.43	0.2969
5	0.0400	172.900	172.9	1.6	37.28	0.2962
6	0.0500	181.100	181.1	2.1	39.05	0.2959
7	0.0640	198.800	198.8	2.6	42.87	0.2954
8	0.0700	204.500	204.5	2.9	44.10	0.2952
9	0.0830	214.000	214.0	3.4	46.14	0.2951
10	0.0900	219.000	219.0	3.7	47.22	0.2951
11	0.1040	229.000	229.0	4.3	49.38	0.2950
12	0.1130	233.500	233.5	4.7	50.35	0.2949
13	0.1200	237.200	237.2	4.9	51.15	0.2949
14	0.1320	236.200	236.2	5.4	50.93	0.2949
15	0.1400	236.400	236.4	5.8	50.97	0.2949
16	0.1500	236.800	236.8	6.2	51.06	0.2949
17	0.1600	238.200	238.2	6.6	51.36	0.2949

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
18	0.1700	231.200	231.2	7.0	49.85	0.2949
19	0.1800	228.100	228.1	7.4	49.18	0.2949

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2363.500		2357.350
Moisture content: Dry soil+tare, gms.	2342.000		2342.000
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	14.8	10.6	10.6
Moist specimen weight, gms.	166.7		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.91	
Net decrease in height, in.		0.09	
Wet density, pcf	136.9	144.9	
Dry density, pcf	119.3	131.1	
Void ratio	0.4132	0.2859	
Saturation, %	96.8	99.9	

Normal stress = 145 psi

Strain rate, in./min. = 0.03

Fail. Stress = 97.33 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	44.200	44.2	0.2	9.53	0.2992
2	0.0100	82.500	82.5	0.4	17.79	0.2984
3	0.0200	138.100	138.1	0.8	29.78	0.2964
4	0.0300	194.000	194.0	1.2	41.83	0.2949
5	0.0400	253.000	253.0	1.6	54.55	0.2930
6	0.0500	290.000	290.0	2.1	62.53	0.2921
7	0.0600	327.400	327.4	2.5	70.60	0.2906
8	0.0700	361.100	361.1	2.9	77.86	0.2902
9	0.0800	384.400	384.4	3.3	82.89	0.2899
10	0.0900	405.000	405.0	3.7	87.33	0.2891
11	0.1000	419.000	419.0	4.1	90.35	0.2888
12	0.1100	431.600	431.6	4.5	93.06	0.2874
13	0.1200	440.600	440.6	4.9	95.00	0.2871
14	0.1300	451.400	451.4	5.3	97.33	0.2868
15	0.1400	450.800	450.8	5.8	97.20	0.2864
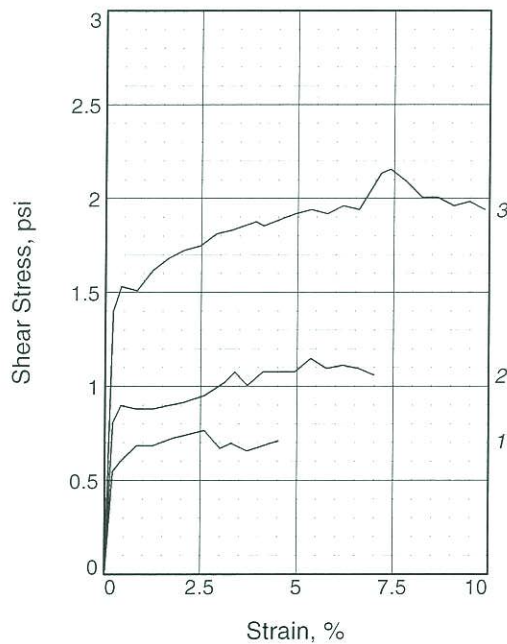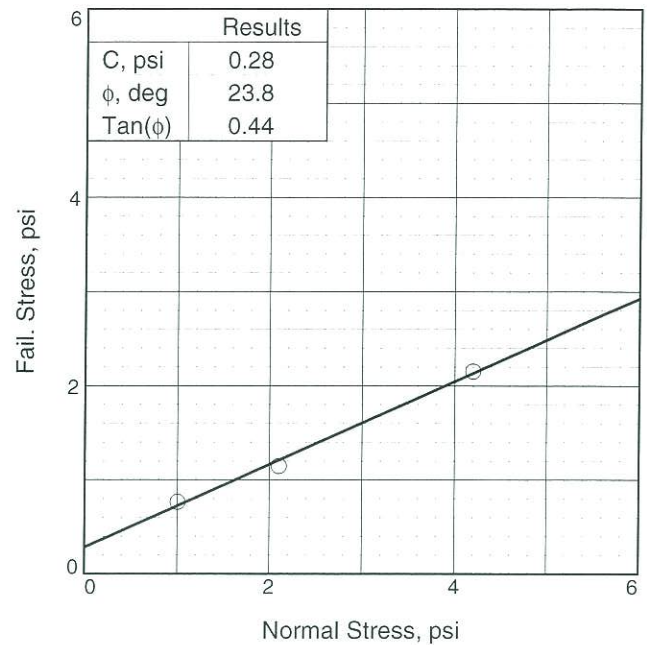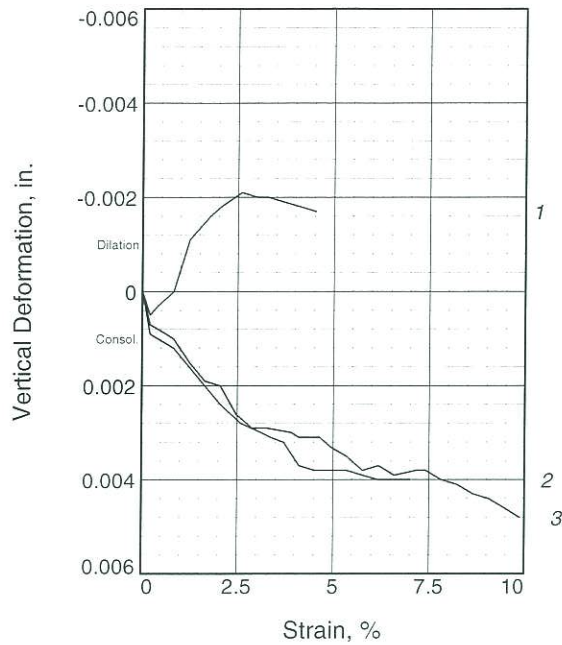
Sample No.		1	2	3
Initial	Water Content, %	11.0	11.0	10.9
	Dry Density, pcf	94.5	94.5	94.6
	Saturation, %	38.1	38.1	37.8
	Void Ratio	0.7828	0.7828	0.7812
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	28.9	28.5	28.3
	Dry Density, pcf	94.6	95.2	95.5
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.7810	0.7713	0.7654
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.99
Normal Stress, psi		1.00	2.10	4.20
Fail. Stress, psi		0.77	1.15	2.16
Strain, %		2.6	5.3	7.4
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Results

C, psi	0.28
ϕ, deg	23.8
Tan(ϕ)	0.44

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
   Fresno to Bakersfield Geotech Investigation
Location: S0019R, S02A
Sample Number: S36326   **Depth:** 5-5.8
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0019R, S02A

Depth: 5-5.8   **Sample Number:** S36326

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2340.400		2361.000
Moisture content: Dry soil+tare, gms.	2327.700		2327.700
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	11.0	28.9	28.9
Moist specimen weight, gms.	127.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	105.0	122.0	
Dry density, pcf	94.5	94.6	
Void ratio	0.7828	0.7810	
Saturation, %	38.1	100.0	

Load ring constant = .6342 lbs. per input unit

Normal stress = 1.0 psi

Strain rate, in./min. = 0.03

Fail. Stress = 0.77 psi **at reading no.** 7

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.000	2.5	0.2	0.55	0.2995
2	0.0100	4.400	2.8	0.4	0.60	0.2997
3	0.0200	5.000	3.2	0.8	0.68	0.3000
4	0.0300	5.000	3.2	1.2	0.68	0.3011
5	0.0430	5.300	3.4	1.8	0.72	0.3016
6	0.0500	5.400	3.4	2.1	0.74	0.3018
7	0.0630	5.600	3.6	2.6	0.77	0.3021
8	0.0730	4.900	3.1	3.0	0.67	0.3020
9	0.0800	5.100	3.2	3.3	0.70	0.3020
10	0.0900	4.800	3.0	3.7	0.66	0.3019
11	0.1000	5.000	3.2	4.1	0.68	0.3018

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	5.200	3.3	4.5	0.71	0.3017

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2324.600		2344.750
Moisture content: Dry soil+tare, gms.	2311.900		2311.900
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	11.0	28.5	28.5
Moist specimen weight, gms.	127.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	105.0	122.3	
Dry density, pcf	94.5	95.2	
Void ratio	0.7828	0.7713	
Saturation, %	38.1	99.9	

Load ring constant = .8323 lbs. per input unit

Normal stress = 2.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 1.15 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.500	3.7	0.2	0.81	0.2991
2	0.0100	5.000	4.2	0.4	0.90	0.2990
3	0.0200	4.900	4.1	0.8	0.88	0.2988
4	0.0300	4.900	4.1	1.2	0.88	0.2984
5	0.0400	5.000	4.2	1.6	0.90	0.2980
6	0.0500	5.100	4.2	2.1	0.92	0.2976
7	0.0630	5.300	4.4	2.6	0.95	0.2972
8	0.0760	5.700	4.7	3.1	1.02	0.2970
9	0.0820	6.000	5.0	3.4	1.08	0.2969
10	0.0900	5.600	4.7	3.7	1.00	0.2968
11	0.1000	6.000	5.0	4.1	1.08	0.2963
12	0.1100	6.000	5.0	4.5	1.08	0.2962
13	0.1200	6.000	5.0	4.9	1.08	0.2962
14	0.1300	6.400	5.3	5.3	1.15	0.2962
15	0.1400	6.100	5.1	5.8	1.09	0.2961
16	0.1500	6.200	5.2	6.2	1.11	0.2960
17	0.1600	6.100	5.1	6.6	1.09	0.2960
18	0.1700	5.900	4.9	7.0	1.06	0.2960

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2324.600		2344.650
Moisture content: Dry soil+tare, gms.	2312.000		2312.000
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	10.9	28.3	28.3
Moist specimen weight, gms.	127.8		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	105.0	122.5	
Dry density, pcf	94.6	95.5	
Void ratio	0.7812	0.7654	
Saturation, %	37.8	100.0	

Normal stress = 4.2 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.16 psi at reading no. 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	6.500	6.5	0.2	1.40	0.2993
2	0.0100	7.100	7.1	0.4	1.53	0.2992
3	0.0200	7.000	7.0	0.8	1.51	0.2990
4	0.0300	7.500	7.5	1.2	1.62	0.2985
5	0.0400	7.800	7.8	1.6	1.68	0.2981
6	0.0500	8.000	8.0	2.1	1.72	0.2980
7	0.0600	8.100	8.1	2.5	1.75	0.2974
8	0.0700	8.400	8.4	2.9	1.81	0.2971
9	0.0800	8.500	8.5	3.3	1.83	0.2971
10	0.0950	8.700	8.7	3.9	1.88	0.2970
11	0.1000	8.600	8.6	4.1	1.85	0.2969
12	0.1130	8.800	8.8	4.7	1.90	0.2969
13	0.1200	8.900	8.9	4.9	1.92	0.2967
14	0.1300	9.000	9.0	5.3	1.94	0.2965
15	0.1400	8.900	8.9	5.8	1.92	0.2962
16	0.1500	9.100	9.1	6.2	1.96	0.2963
17	0.1600	9.000	9.0	6.6	1.94	0.2961
18	0.1740	9.900	9.9	7.2	2.13	0.2962
19	0.1800	10.000	10.0	7.4	2.16	0.2962
20	0.1900	9.700	9.7	7.8	2.09	0.2960
21	0.2000	9.300	9.3	8.2	2.01	0.2959
22	0.2100	9.300	9.3	8.6	2.01	0.2957
23	0.2200	9.100	9.1	9.1	1.96	0.2956
24	0.2300	9.200	9.2	9.5	1.98	0.2954
25	0.2400	9.000	9.0	9.9	1.94	0.2952

Results

C, psi	0.40
φ, deg	36.3
Tan(φ)	0.74

Vertical Deformation, in. — Strain, %

Fail. Stress, psi — Normal Stress, psi

Shear Stress, psi — Strain, %
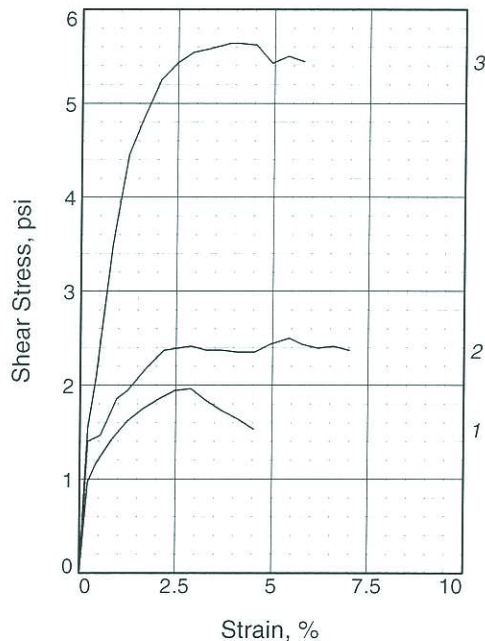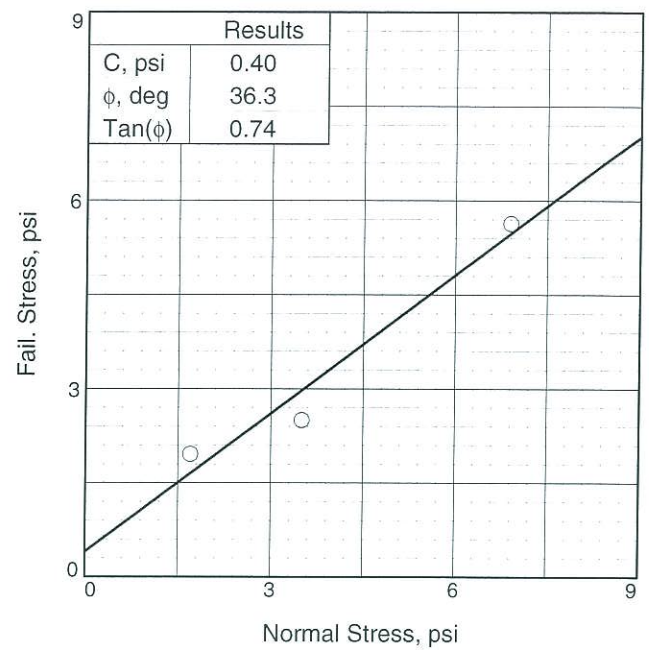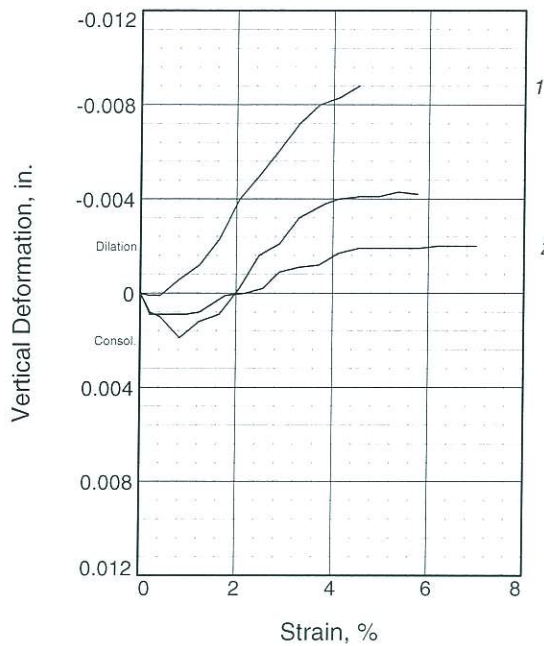
Sample No.		1	2	3
Initial	Water Content, %	16.8	16.7	16.9
	Dry Density, pcf	98.4	98.5	98.3
	Saturation, %	63.6	63.3	63.8
	Void Ratio	0.7128	0.7114	0.7142
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	26.0	24.9	25.7
	Dry Density, pcf	99.0	100.7	99.4
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.7031	0.6736	0.6952
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.98	0.99
Normal Stress, psi		1.70	3.50	6.90
Fail. Stress, psi		1.96	2.50	5.64
Strain, %		2.9	5.4	3.8
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0019R, S04B
Sample Number: S36328   **Depth:** 9-10.0
Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Figure _____

Tested By: mw   **Checked By:** mpw

Date:
Client: URS / HMM/ ARUP
Project: CA High Speed Train
                      Fresno to Bakersfield Geotech Investigation
                      #SA-HST019
Project No.:   11-111
Location: S0019R, S04B
Depth: 9-10.0   **Sample Number:**   S36328
Description:
Remarks:
Type of Sample: Remold
Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2336.200		2347.250
Moisture content: Dry soil+tare, gms.	2316.100		2316.100
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	16.8	26.0	26.0
Moist specimen weight, gms.	139.9		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	114.9	124.7	
Dry density, pcf	98.4	99.0	
Void ratio	0.7128	0.7031	
Saturation, %	63.6	99.9	

Test Readings for Specimen No. 1

Normal stress = 1.7 psi
Strain rate, in./min. = 0.03
Fail. Stress = 1.96 psi **at reading no.** 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.500	4.5	0.2	0.97	0.2999
2	0.0100	5.400	5.4	0.4	1.16	0.2999
3	0.0200	6.600	6.6	0.8	1.42	0.3006
4	0.0300	7.500	7.5	1.2	1.62	0.3012
5	0.0400	8.100	8.1	1.6	1.75	0.3023
6	0.0500	8.600	8.6	2.1	1.85	0.3040
7	0.0600	9.000	9.0	2.5	1.94	0.3050
8	0.0700	9.100	9.1	2.9	1.96	0.3061
9	0.0800	8.500	8.5	3.3	1.83	0.3072
10	0.0900	8.000	8.0	3.7	1.72	0.3080
11	0.1000	7.600	7.6	4.1	1.64	0.3083
12	0.1100	7.100	7.1	4.5	1.53	0.3088

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2336.200		2346.100
Moisture content: Dry soil+tare, gms.	2316.200		2316.200
Moisture content: Tare, gms.	2196.300		2196.300
Moisture, %	16.7	24.9	24.9
Moist specimen weight, gms.	139.9		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	114.9	125.8	
Dry density, pcf	98.5	100.7	
Void ratio	0.7114	0.6736	
Saturation, %	63.3	100.0	

Normal stress = 3.5 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.50 psi at reading no. 14

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	6.500	6.5	0.2	1.40	0.2991
2	0.0130	6.800	6.8	0.5	1.47	0.2991
3	0.0230	8.600	8.6	0.9	1.85	0.2991
4	0.0300	9.000	9.0	1.2	1.94	0.2992
5	0.0430	10.200	10.2	1.8	2.20	0.2999
6	0.0530	11.000	11.0	2.2	2.37	0.3000
7	0.0620	11.100	11.1	2.6	2.39	0.3002
8	0.0700	11.200	11.2	2.9	2.41	0.3009
9	0.0800	11.000	11.0	3.3	2.37	0.3011
10	0.0900	11.000	11.0	3.7	2.37	0.3012
11	0.1000	10.900	10.9	4.1	2.35	0.3017
12	0.1100	10.900	10.9	4.5	2.35	0.3019
13	0.1200	11.300	11.3	4.9	2.44	0.3019
14	0.1320	11.600	11.6	5.4	2.50	0.3019
15	0.1400	11.300	11.3	5.8	2.44	0.3019
16	0.1500	11.100	11.1	6.2	2.39	0.3020
17	0.1600	11.200	11.2	6.6	2.41	0.3020
18	0.1700	11.000	11.0	7.0	2.37	0.3020

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2336.700		2347.300
Moisture content: Dry soil+tare, gms.	2316.500		2316.500
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	16.9	25.7	25.7
Moist specimen weight, gms.	139.9		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	114.9	125.0	
Dry density, pcf	98.3	99.4	
Void ratio	0.7142	0.6952	
Saturation, %	63.8	99.9	

Load ring constant = .8988 lbs. per input unit

Normal stress = 6.9 psi

Strain rate, in./min. = 0.03

Fail. Stress = 5.64 psi **at reading no.** 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	8.000	7.2	0.2	1.55	0.2992
2	0.0100	10.800	9.7	0.4	2.09	0.2990
3	0.0200	18.000	16.2	0.8	3.49	0.2981
4	0.0300	23.000	20.7	1.2	4.46	0.2988
5	0.0400	25.100	22.6	1.6	4.86	0.2991
6	0.0500	27.100	24.4	2.1	5.25	0.3002
7	0.0600	28.000	25.2	2.5	5.43	0.3016
8	0.0700	28.600	25.7	2.9	5.54	0.3021
9	0.0800	28.800	25.9	3.3	5.58	0.3032
10	0.0930	29.100	26.2	3.8	5.64	0.3038
11	0.1000	29.100	26.2	4.1	5.64	0.3040
12	0.1100	29.000	26.1	4.5	5.62	0.3041
13	0.1200	28.000	25.2	4.9	5.43	0.3041
14	0.1300	28.400	25.5	5.3	5.50	0.3043
15	0.1400	28.100	25.3	5.8	5.45	0.3042

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Results

C, psi	0.31
ϕ, deg	41.9
Tan(ϕ)	0.90

Vertical Deformation, in. vs **Strain, %**
- Dilation / Consol.
- Curves labeled 1, 2, 3

Fail. Stress, psi vs **Normal Stress, psi**

Shear Stress, psi vs **Strain, %**
- Curves labeled 1, 2, 3
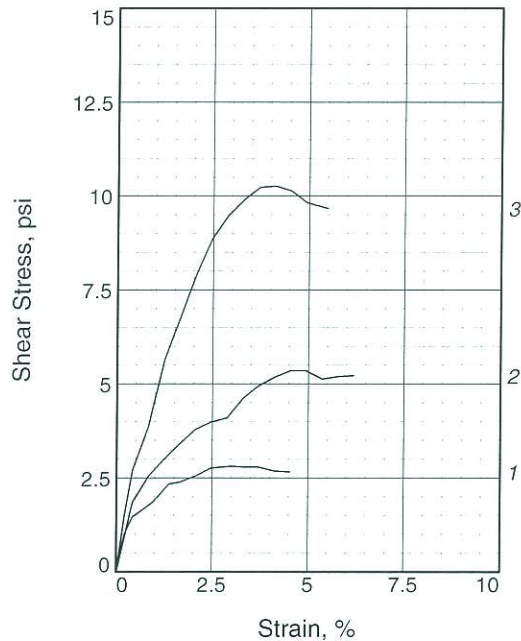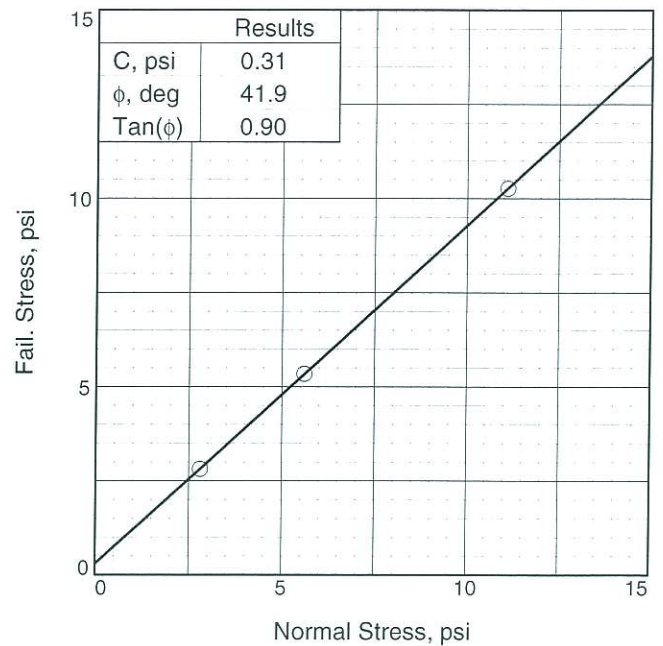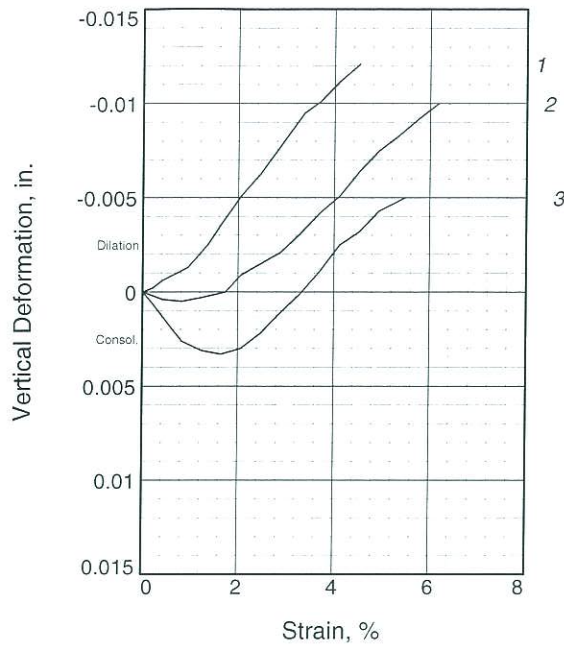
Sample No.		1	2	3
Initial	Water Content, %	23.4	23.7	23.8
	Dry Density, pcf	94.8	94.5	94.5
	Saturation, %	81.2	81.8	82.0
	Void Ratio	0.7781	0.7828	0.7843
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	28.6	28.5	27.3
	Dry Density, pcf	95.2	95.2	97.1
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.7710	0.7703	0.7367
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	0.99	0.97
Normal Stress, psi		2.80	5.60	11.10
Fail. Stress, psi		2.82	5.35	10.27
Strain, %		3.0	4.5	4.1
Ult. Stress, psi				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Remold
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: URS / HMM/ ARUP

Project: CA High Speed Train
  Fresno to Bakersfield Geotech Investigation
Location: S0019R, S08

Sample Number: S36329   **Depth:** 14-15.2

Proj. No.: 11-111   **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw   **Checked By:** mpw

DIRECT SHEAR TEST

Date:

Client: URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation
#SA-HST019

Project No.: 11-111

Location: S0019R, S08

Depth: 14-15.2   **Sample Number:** S36329

Description:

Remarks:

Type of Sample: Remold

Specific Gravity=2.70   **LL=**   **PL=**   **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2339.200		2345.150
Moisture content: Dry soil+tare, gms.	2312.200		2312.200
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	23.4	28.6	28.6
Moist specimen weight, gms.	142.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	117.0	122.3	
Dry density, pcf	94.8	95.2	
Void ratio	0.7781	0.7710	
Saturation, %	81.2	100.0	

Test Readings for Specimen No. 1

Load ring constant = 1.2322 lbs. per input unit

Normal stress = 2.8 psi

Strain rate, in./min. = 0.03

Fail. Stress = 2.82 psi **at reading no.** 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	3.800	4.7	0.2	1.01	0.3002
2	0.0100	5.500	6.8	0.4	1.46	0.3006
3	0.0230	7.000	8.6	0.9	1.86	0.3013
4	0.0330	8.800	10.8	1.4	2.34	0.3025
5	0.0400	9.000	11.1	1.6	2.39	0.3036
6	0.0500	9.600	11.8	2.1	2.55	0.3051
7	0.0600	10.400	12.8	2.5	2.76	0.3063
8	0.0730	10.600	13.1	3.0	2.82	0.3082
9	0.0820	10.500	12.9	3.4	2.79	0.3095
10	0.0900	10.500	12.9	3.7	2.79	0.3101
11	0.1000	10.100	12.4	4.1	2.68	0.3112

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No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
12	0.1100	10.000	12.3	4.5	2.66	0.3121

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2355.000		2360.500
Moisture content: Dry soil+tare, gms.	2327.700		2327.700
Moisture content: Tare, gms.	2212.600		2212.600
Moisture, %	23.7	28.5	28.5
Moist specimen weight, gms.	142.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	117.0	122.3	
Dry density, pcf	94.5	95.2	
Void ratio	0.7828	0.7703	
Saturation, %	81.8	99.9	

Normal stress = 5.6 psi

Strain rate, in./min. = 0.03

Fail. Stress = 5.35 psi at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	4.300	4.3	0.2	0.93	0.2998
2	0.0100	8.600	8.6	0.4	1.85	0.2996
3	0.0200	11.800	11.8	0.8	2.54	0.2995
4	0.0300	13.900	13.9	1.2	3.00	0.2997
5	0.0420	16.200	16.2	1.7	3.49	0.3000
6	0.0500	17.600	17.6	2.1	3.79	0.3009
7	0.0600	18.500	18.5	2.5	3.99	0.3015
8	0.0700	19.000	19.0	2.9	4.10	0.3021
9	0.0800	21.400	21.4	3.3	4.61	0.3031
10	0.0900	23.000	23.0	3.7	4.96	0.3042
11	0.1000	24.000	24.0	4.1	5.17	0.3051
12	0.1100	24.800	24.8	4.5	5.35	0.3064
13	0.1200	24.800	24.8	4.9	5.35	0.3075
14	0.1300	23.800	23.8	5.3	5.13	0.3083
15	0.1400	24.100	24.1	5.8	5.20	0.3092
16	0.1500	24.200	24.2	6.2	5.22	0.3100

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	2339.200		2343.150
Moisture content: Dry soil+tare, gms.	2311.800		2311.800
Moisture content: Tare, gms.	2196.800		2196.800
Moisture, %	23.8	27.3	27.3
Moist specimen weight, gms.	142.4		
Diameter, in.	2.43	2.43	
Area, in.²	4.64	4.64	
Height, in.	1.00	0.97	
Net decrease in height, in.		0.03	
Wet density, pcf	117.0	123.5	
Dry density, pcf	94.5	97.1	
Void ratio	0.7843	0.7367	
Saturation, %	82.0	99.9	

Load ring constant = .8988 lbs. per input unit

Normal stress = 11.1 psi

Strain rate, in./min. = 0.03

Fail. Stress = 10.27 psi at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psi	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.0	0.00	0.3000
1	0.0050	7.800	7.0	0.2	1.51	0.2994
2	0.0100	14.000	12.6	0.4	2.71	0.2987
3	0.0200	20.000	18.0	0.8	3.88	0.2974
4	0.0300	29.100	26.2	1.2	5.64	0.2969
5	0.0400	34.900	31.4	1.6	6.76	0.2967
6	0.0500	40.800	36.7	2.1	7.91	0.2970
7	0.0600	45.700	41.1	2.5	8.86	0.2978
8	0.0700	48.900	44.0	2.9	9.48	0.2989
9	0.0800	51.100	45.9	3.3	9.90	0.2999
10	0.0900	52.800	47.5	3.7	10.23	0.3011
11	0.1000	53.000	47.6	4.1	10.27	0.3025
12	0.1100	52.300	47.0	4.5	10.14	0.3032
13	0.1200	50.700	45.6	4.9	9.83	0.3043
14	0.1330	49.900	44.9	5.5	9.67	0.3050

Sierra Testing Labs, Inc.

| | | | | | TABLE E-4 | | |
| | | | | SUMMARY OF MODIFIED PROCTOR TESTS | | | |
Borehole ID	Sample No.	Depth (ft)	USGS Group	Elevation (NAVD88) (ft)	Max. Dry Unit Weight (pcf)	Optimum Moisture Content (%)
S0001R	S01	0 - 5.0	SM	284.9	136.6	6.4
S0003R	S01	0 - 5.0	SM	285.5	136.7	6.4
S0004R	S01	0 - 5.0	ML	281.2	121.0	12.2
S0005R	S01	0 - 5.0	SP-SM	282.8	133.9	6.0
S0013AR	S01	0 - 5.0	SM	283.6	125.5	9.8
S0015R	S01	0 - 5.0	SM	284.2	130.3	8.2
S0017R	S01	0 - 5.0	SM	288.0	125.4	7.6
S0018R	S01	0 - 5.0	SM	303.3	127.4	8.6
S0019R	S01	0 - 5.0	SM	290.0	123.4	7.8

COMPACTION TEST REPORT

Curve No. S36223

ZAV SpG 2.70

6.4%, 136.6 pcf

(Graph: Dry density, pcf vs Water content, %)

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	4206.0	4216.0	4125.0	4014.0		
WM	2030.0	2030.0	2030.0	2030.0		
WW + T #1	474.0	474.9	465.7	457.5		
WD + T #1	451.0	444.2	428.9	443.2		
TARE #1	51.4	52.0	50.7	42.7		
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	5.8	7.8	9.7	3.6		
DRY DENS.	136.1	134.1	126.3	126.7		

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	31.9	

TEST RESULTS

Maximum dry density = 136.6 pcf

Optimum moisture = 6.4 %

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0001R, S01   **Depth:** 0-5.0   **Sample No.:** S36223

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: _____ cw

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36232
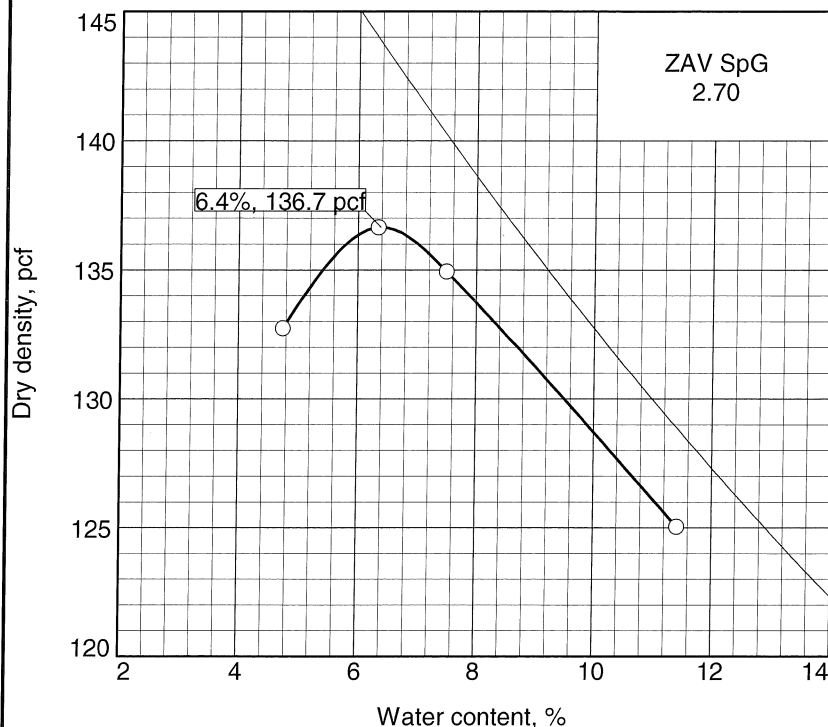
ZAV SpG 2.70

6.4%, 136.7 pcf

(Chart: Dry density, pcf vs Water content, %)

Preparation Method		
Rammer: Wt. 10 lb.	Drop	18 in.
Type		
Layers: No. five	Blows per	25
Mold Size 0.03333 cu. ft.		

Test Performed on Material
Passing   3/8 in.   Sieve

%>3/8 in.	%<No.200	24.1

Atterberg (D 4318): LL _____ PI _____

NM (D 2216) 3.3 Sp.G. (D 854) _____

USCS (D 2487) _____

AASHTO (M 145) _____

Date: Sampled _____

Received   11/16/11

Tested   11/16/11

Tested By   dp

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	4102.1	4197.0	4193.0	4106.3		
WM	2000.0	2000.0	2000.0	2000.0		
WW + T #1	389.1	312.2	328.9	307.7		
WD + T #1	373.8	296.7	308.8	281.4		
TARE #1	51.2	52.2	40.4	50.9		
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	4.7	6.3	7.5	11.4		
DRY DENS.	132.7	136.7	135.0	125.1		

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	24.1	

TEST RESULTS

Maximum dry density = 136.7 pcf

Optimum moisture = 6.4 %

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0003R, S01   **Depth:** 0-5.0   **Sample No.:** S36232

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: _____ cw

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36239
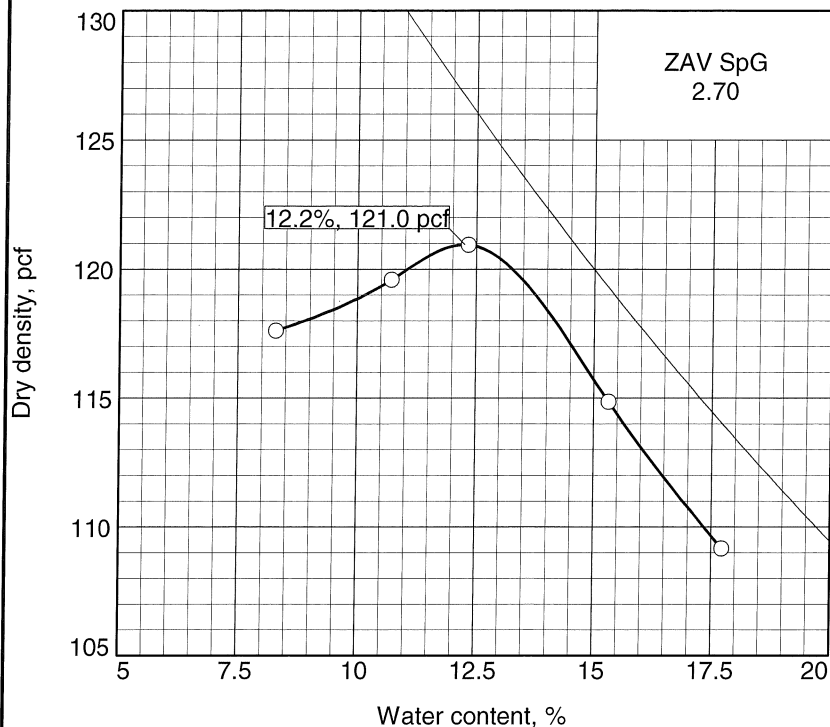
ZAV SpG 2.70

12.2%, 121.0 pcf

(Graph: Dry density, pcf (y-axis, 105–130) vs Water content, % (x-axis, 5–20))

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	4002.5	3942.9	4054.0	4001.7	3925.6	
WM	2000.0	2000.0	2000.0	2000.0	2000.0	
WW + T #1	316.5	290.4	275.3	349.6	304.4	
WD + T #1	281.5	254.6	250.9	320.8	285.0	
TARE #1	52.9	52.6	53.0	51.9	51.0	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	15.3	17.7	12.3	10.7	8.3	
DRY DENS.	114.9	109.2	120.9	119.6	117.6	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	51.8	

TEST RESULTS

Maximum dry density = 121.0 pcf

Optimum moisture = 12.2 %

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0004R, S01   **Depth:** 0-5.0   **Sample No.:** S36239

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: _____ cw

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36245
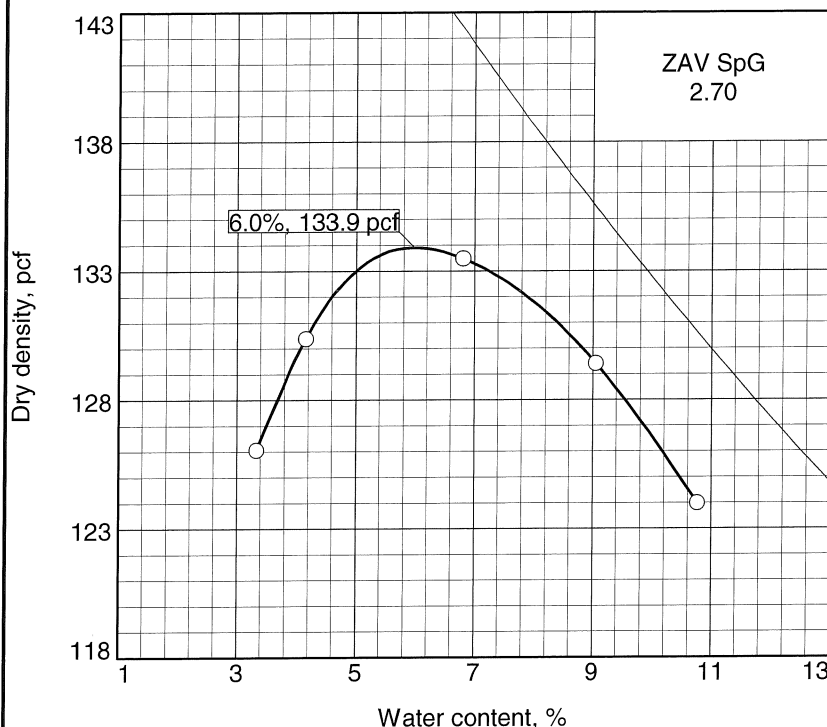
ZAV SpG
2.70

6.0%, 133.9 pcf

Dry density, pcf

Water content, %

Preparation Method		
Rammer: Wt. __10 lb.__ Drop __18 in.__		
Type _____		
Layers: No. __five__ Blows per __25__		
Mold Size __0.03333 cu. ft.__		

Test Performed on Material
   Passing __3/8 in.__ Sieve

%>3/8 in. _____ %<No.200 _____

Atterberg (D 4318): LL _____ PI _____

NM (D 2216) _____ Sp.G. (D 854) _____

  USCS (D 2487) _____

  AASHTO (M 145) _____

Date: Sampled _____

    Received __11/16/11__

    Tested __11/16/11__

Tested By __dp__

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	4053.2	4155.3	4133.6	4076.3	3969.4	
WM	2000.0	2000.0	2000.0	2000.0	2000.0	
WW + T #1	327.1	395.5	391.7	330.0	312.2	
WD + T #1	316.1	373.6	363.3	301.9	303.8	
TARE #1	51.4	51.6	49.3	40.8	51.9	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	4.2	6.8	9.0	10.8	3.3	
DRY DENS.	130.4	133.5	129.4	124.0	126.1	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.

TEST RESULTS

Maximum dry density = 133.9 pcf

Optimum moisture = 6.0 %

Project No. 11-111	**Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0005R, S01   **Depth:** 0-5.0   **Sample No.:** S36245

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: __cw__

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36271
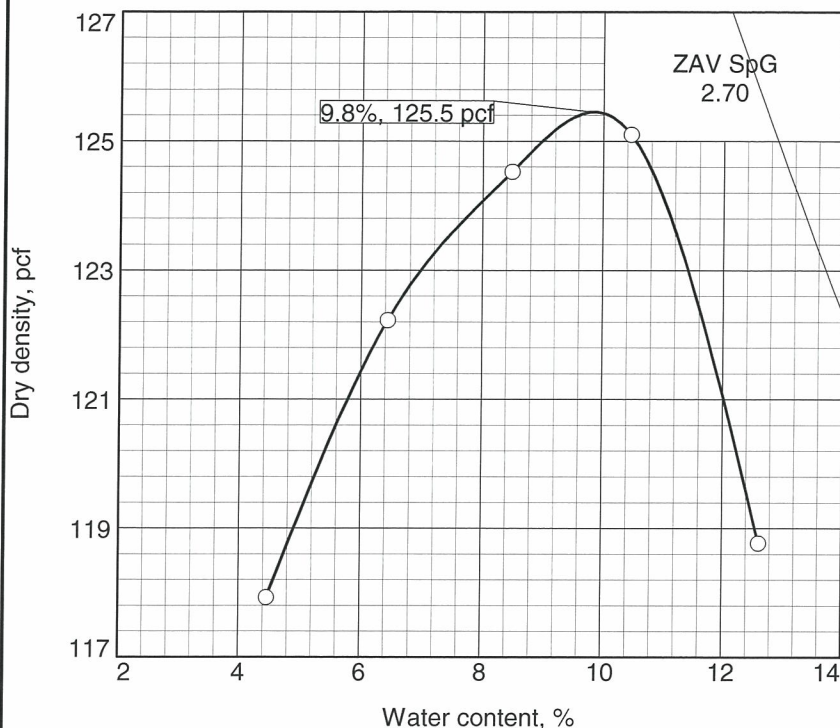
Dry density, pcf vs Water content, %

9.8%, 125.5 pcf

ZAV SpG 2.70

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	3966.8	4042.3	4089.1	4022.1	3862.4	
WM	2000.0	2000.0	2000.0	2000.0	2000.0	
WW + T #1	357.7	325.7	370.8	430.5	395.4	
WD + T #1	339.2	304.3	339.6	388.1	380.7	
TARE #1	51.7	52.0	41.2	51.9	51.1	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	6.4	8.5	10.5	12.6	4.5	
DRY DENS.	122.2	124.5	125.1	118.8	117.9	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	48.3	

TEST RESULTS

Maximum dry density = 125.5 pcf

Optimum moisture = 9.8 %

Material Description

Remarks:

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0013AR, S01   **Depth:** 0-5.0   **Sample No.:** S36271

Checked by: _____ cw

Title: PM

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

COMPACTION TEST REPORT

Curve No. S36286
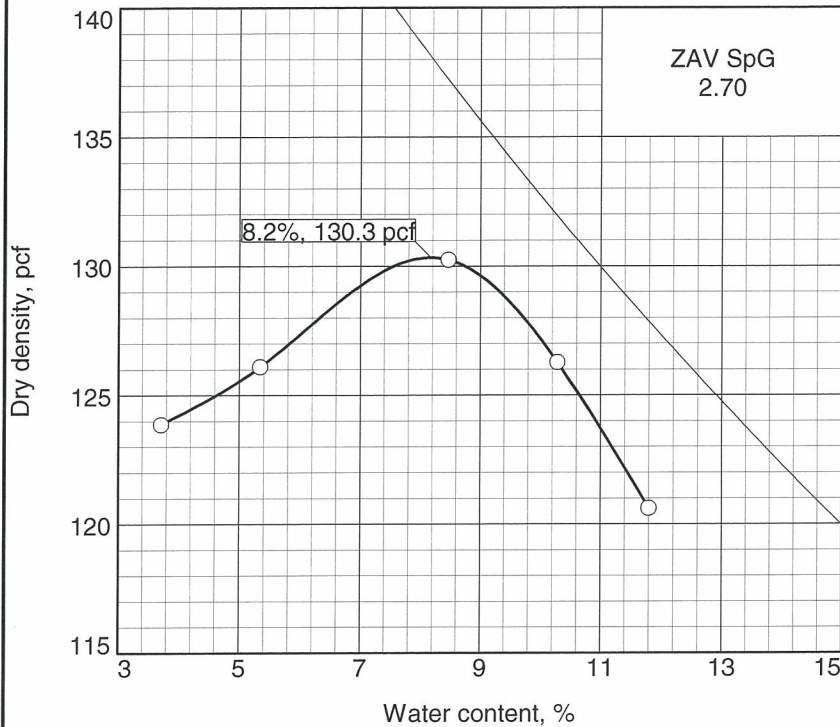
8.2%, 130.3 pcf

ZAV SpG 2.70

(Graph: Dry density, pcf vs Water content, %)

Preparation Method	
Rammer: Wt. __10 lb.__ Drop __18 in.__	
Type _____	
Layers: No. __five__ Blows per __25__	
Mold Size __0.03333 cu. ft.__	

Test Performed on Material
Passing __3/8 in.__ Sieve

%>3/8 in. _____ %<No.200 __34.5__
Atterberg (D 4318): LL _____ PI _____
NM (D 2216) _____ Sp.G. (D 854) _____
USCS (D 2487) _____
AASHTO (M 145) _____
Date: Sampled _____
Received __11/16/11__
Tested __11/16/11__
Tested By __dp__

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	4008.3	4135.8	4105.4	4038.6	3942.3	
WM	2000.0	2000.0	2000.0	2000.0	2000.0	
WW + T #1	375.1	285.6	330.0	315.4	357.7	
WD + T #1	358.7	267.3	304.5	287.6	346.8	
TARE #1	51.6	51.0	56.5	51.9	52.8	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	5.3	8.5	10.3	11.8	3.7	
DRY DENS.	126.1	130.3	126.3	120.6	123.9	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	34.5	

TEST RESULTS

Maximum dry density = 130.3 pcf

Optimum moisture = 8.2 %

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0015R, S01   **Depth:** 0-5.0   **Sample No.:** S36286

## SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: _____ cw

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36303
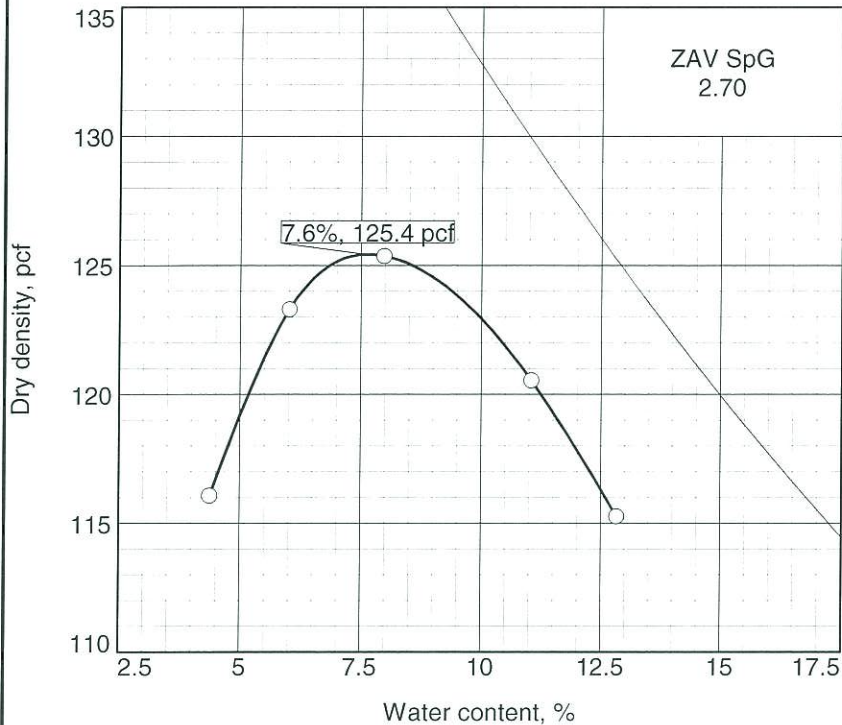
ZAV SpG 2.70

7.6%, 125.4 pcf

Dry density, pcf

Water content, %

Preparation Method			
Rammer: Wt.	10 lb.	Drop	18 in.
Type			
Layers: No.	five	Blows per	25
Mold Size	0.03333 cu. ft.		

Test Performed on Material

Passing ___3/8 in.___ Sieve

%>3/8 in. _____ %<No.200 __43.3__

Atterberg (D 4318): LL _____ PI _____

NM (D 2216) _____ Sp.G. (D 854) _____

USCS (D 2487) _____

AASHTO (M 145) _____

Date: Sampled _____

Received ___11/16/11___

Tested ___11/16/11___

Tested By ___dp___

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	3976.1	4046.3	4023.6	3966.3	3831.6	
WM	2000.0	2000.0	2000.0	2000.0	2000.0	
WW + T #1	316.4	252.2	339.1	358.5	336.4	
WD + T #1	301.4	236.6	310.6	323.6	324.5	
TARE #1	51.8	40.8	52.4	51.5	52.2	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	6.0	8.0	11.0	12.8	4.4	
DRY DENS.	123.3	125.4	120.5	115.3	116.1	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	43.3	

TEST RESULTS

Maximum dry density = 125.4 pcf

Optimum moisture = 7.6 %

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0017R, S01   **Depth:** 0-5.0   **Sample No.:** S36303

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: ___cw___

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36314
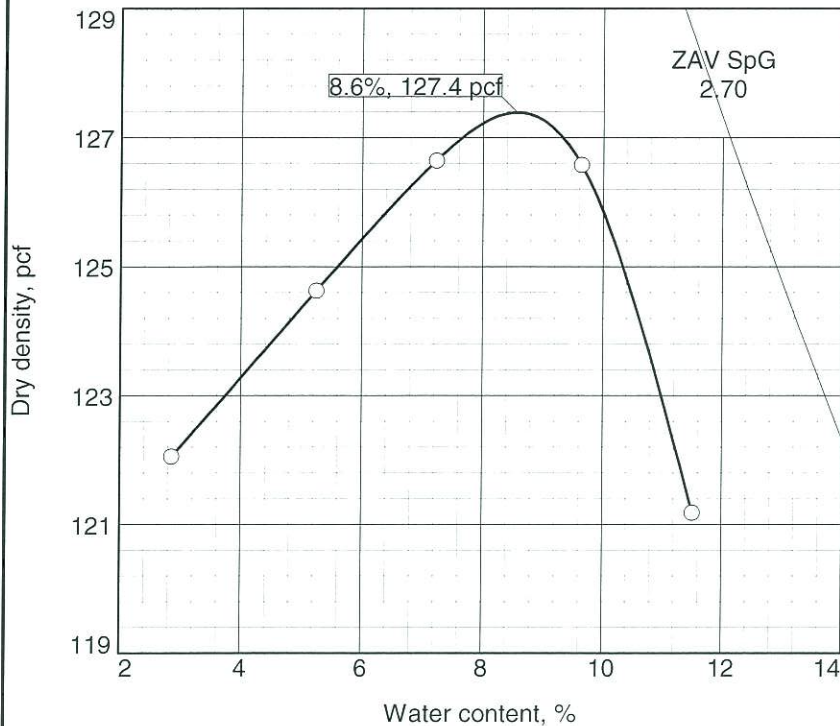
Graph: Dry density, pcf (y-axis, 119 to 129) vs. Water content, % (x-axis, 2 to 14). Labeled point: 8.6%, 127.4 pcf. ZAV SpG 2.70.

Preparation Method _____

Rammer: Wt. __10 lb.__ Drop __18 in.__

Type _____

Layers: No. __five__ Blows per __25__

Mold Size __0.03333 cu. ft.__

Test Performed on Material

Passing __3/8 in.__ Sieve

%>3/8 in. _____ %<No.200 __40.1__

Atterberg (D 4318): LL _____ PI _____

NM (D 2216) _____ Sp.G. (D 854) _____

USCS (D 2487) _____

AASHTO (M 145) _____

Date: Sampled _____

Received __11/16/11__

Tested __11/16/11__

Tested By __sm__

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	4060.0	4105.0	4050.0	3990.0	3905.0	
WM	2007.0	2007.0	2007.0	2007.0	2007.0	
WW + T #1	382.2	372.5	352.7	409.8	365.4	
WD + T #1	359.9	343.5	320.5	391.9	356.7	
TARE #1	51.3	42.5	40.8	50.6	52.1	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	7.2	9.6	11.5	5.2	2.9	
DRY DENS.	126.6	126.6	121.2	124.6	122.1	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	40.1	

TEST RESULTS

Maximum dry density = 127.4 pcf

Optimum moisture = 8.6 %

Project No. 11-111 **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0018R. S01 **Depth:** 0-5.0 **Sample No.:** S36314

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: __cw__

Title: PM

Figure

COMPACTION TEST REPORT

Curve No. S36325
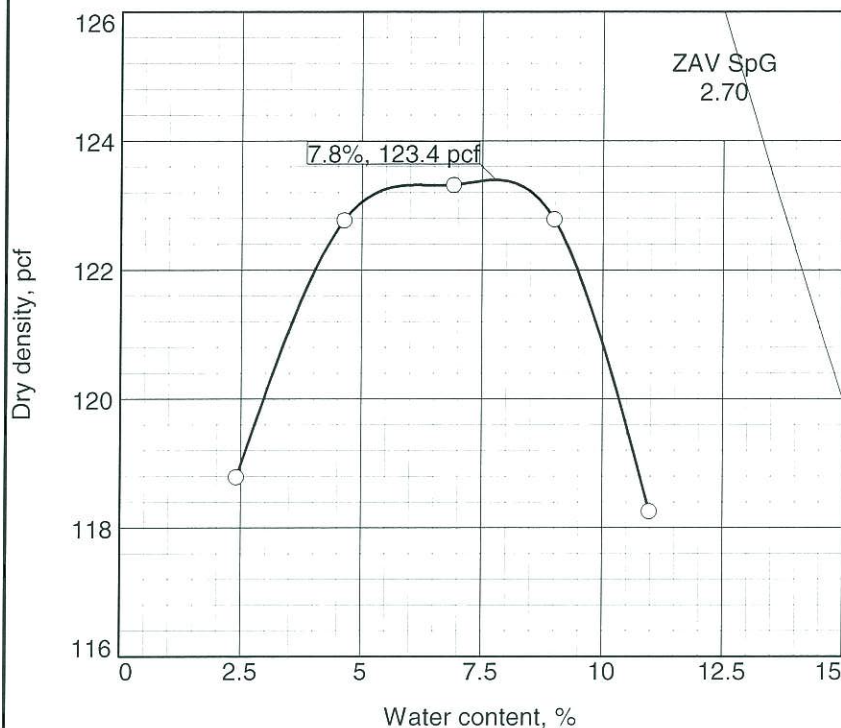
Graph — Dry density, pcf (y-axis, 116 to 126) vs Water content, % (x-axis, 0 to 15)
ZAV SpG 2.70
7.8%, 123.4 pcf

Preparation Method	
Rammer: Wt. **10 lb.** Drop **18 in.**	
Type	
Layers: No. **five** Blows per **25**	
Mold Size **0.03333 cu. ft.**	

Test Performed on Material

Passing **3/8 in.** Sieve

%>3/8 in. _____ %<No.200 **38.3**

Atterberg (D 4318): LL _____ PI _____

NM (D 2216) _____ Sp.G. (D 854) _____

USCS (D 2487) _____

AASHTO (M 145) _____

Date: Sampled _____

Received **11/16/11**

Tested **11/16/11**

Tested By **sm**

COMPACTION TESTING DATA
ASTM D 1557-07 Method B Modified

	1	2	3	4	5	6
WM + WS	3830.0	3933.0	3984.0	4014.0	3975.0	
WM	1991.0	1991.0	1991.0	1991.0	1991.0	
WW + T #1	356.3	429.4	443.4	451.9	367.6	
WD + T #1	348.1	410.7	415.2	415.2	331.9	
TARE #1	6.5	6.5	6.5	6.5	6.5	
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	2.4	4.6	6.9	9.0	11.0	
DRY DENS.	118.8	122.8	123.3	122.8	118.3	

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
#200	38.3	

TEST RESULTS

Maximum dry density = 123.4 pcf

Optimum moisture = 7.8 %

Project No. 11-111   **Client:** URS / HMM/ ARUP

Project: CA High Speed Train
Fresno to Bakersfield Geotech Investigation

○ **Loc.:** S0019R, S01   **Depth:** 0-5.0   **Sample No.:** S36325

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Material Description

Remarks:

Checked by: cw

Title: PM

Figure

Borehole ID	Sample No.	Depth (ft)	USGS Group	Elevation (NAVD88) (ft)	California Bearing Ratio
S0001R	S01	0 - 5.0	SM	284.9	47
S0003R	S01	0 - 5.0	SM	285.5	40
S0004R	S01	0 - 5.0	ML	281.2	20
S0005R	S01	0 - 5.0	SP-SM	282.8	50
S0013AR	S01	0 - 5.0	SM	283.6	13
S0015R	S01	0 - 5.0	SM	284.2	35
S0017R	S01	0 - 5.0	SM	288.0	28
S0018R	S01	0 - 5.0	SM	303.3	23
S0019R	S01	0 - 5.0	SM	290.0	13

TABLE E-5

SUMMARY OF CALIFORNIA BEARING RATIO TESTS

CALIFORNIA BEARING RATIO

CBR At 0.1" Penetration At	95%	Compaction	47

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0001R, S01
SAMPLE DESCRIPTION: N/A
REMARKS:

Lab Number: S36223

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd. El Dorado Hills. CA 95762

CALIFORNIA BEARING RATIO
WORKSHEET

PROJECT NAME : CA High Speed Train, Fresno to Bakersfield	PROJECT NUMBER :	11-111
SAMPLE ID. : S0001R, S01	DEPTH :	0-5.0
LABORATORY NO. : S36223	DATE :	11/16/11
TECHNICIAN :		
MATERIAL DESCRIPTION : N/A	GROUP SYMBOL :	

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8569	8776		8917	9017		9191	9222		Tare Identification	
Mold Wt.	4180	4180		4198	4198		4209	4209		Wet soil + tare	
Mold ID.		A			B			C		Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	369.5	338.6	313.5	347.0	365.3	389.4	313.3	367.9	374.8		
Dry Soil & Tare, g	348.5	307.3	283.2	327.0	339.6	359.4	295.6	346.8	350.5	Moist. Adjustment	
Tare Wt., g	6.5	8.2	8.2	6.5	8.2	8.2	6.5	8.2	8.2	Desired Moist. Content	
Moisture , %	**6.1**	**10.5**	**11.0**	**6.2**	**7.8**	**8.5**	**6.1**	**6.2**	**7.1**	Wet Wt. Of Soil As Is, g	
		Avg.	10.7		Avg.	8.1		Avg.	6.7	Wt.Of Water To Add, g	
Wet Unit Wt., pcf	**129.0**	**134.8**		**138.7**	**141.3**		**146.4**	**147.0**			
Dry Unit Wt., pcf	**121.5**	**121.7**		**130.5**	**130.2**		**138.0**	**137.3**			

SATURATION DATA

Mold ID:	A		Mold ID:	B		Mold ID:	C	
Surcharge Wt.:	10		Surcharge Wt.:	10		Surcharge Wt.:	10	
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
1/11/00	12:40 PM	0.2813	11/19/11	12:40 PM	0.3250	11/19/11	12:40 PM	0.2658
11/23/11	3:20 PM	0.2859	11/23/11	3:20 PM	0.3308	11/23/11	3:20 PM	0.2702
	% Swell	0.1		% Swell	0.1		% Swell	0.1

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loading Factor: 1 Mold ID: A				Loading Factor: 1 Mold ID: B				Loading Factor: 1 Mold ID: C			
Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	149.1	49.7		0.025	458.1	152.7		0.025	584.9	195	
0.050	203.5	67.8		0.050	845.3	281.8		0.050	1454.9	485	
0.075	241.4	80.5		0.075	1190.5	396.8		0.075	2468.3	822.8	
0.100	271.0	90.3	90	0.100	1536.5	512.2	512	0.100	3438.8	1146.3	1240
0.125	297.4	99.1		0.125	1843.0	614.3		0.125	4336.8	1445.6	
0.150	322.1	107.4		0.150	2120.6	706.9		0.150	5201.0	1733.7	
0.175	345.2	115.1		0.175	2367.8	789.3		0.175	6008.4	2002.8	
0.200	366.6	122.2	122	0.200	2592.7	864.2	864	0.200	6765.5	2255.2	2330
0.300	442.4	147.5		0.300	3353.9	1118		0.300	9413.3	3137.8	
0.400	511.6	170.5		0.400	3763.4	1254.5		0.400			
0.500	572.6	190.9		0.500	4110.4	1370.1		0.500			

Standard Sress, psi	Penetration Depth, in.	Bearing Ratio		Standard Sress, psi	Penetration Depth, in.	Bearing Ratio		Standard Sress, psi	Penetration Depth, in.	Bearing Ratio
1000	0.100	9		1000	0.100	51		1000	0.100	124
1500	0.200	8		1500	0.200	58		1500	0.200	155

CALIFORNIA BEARING RATIO
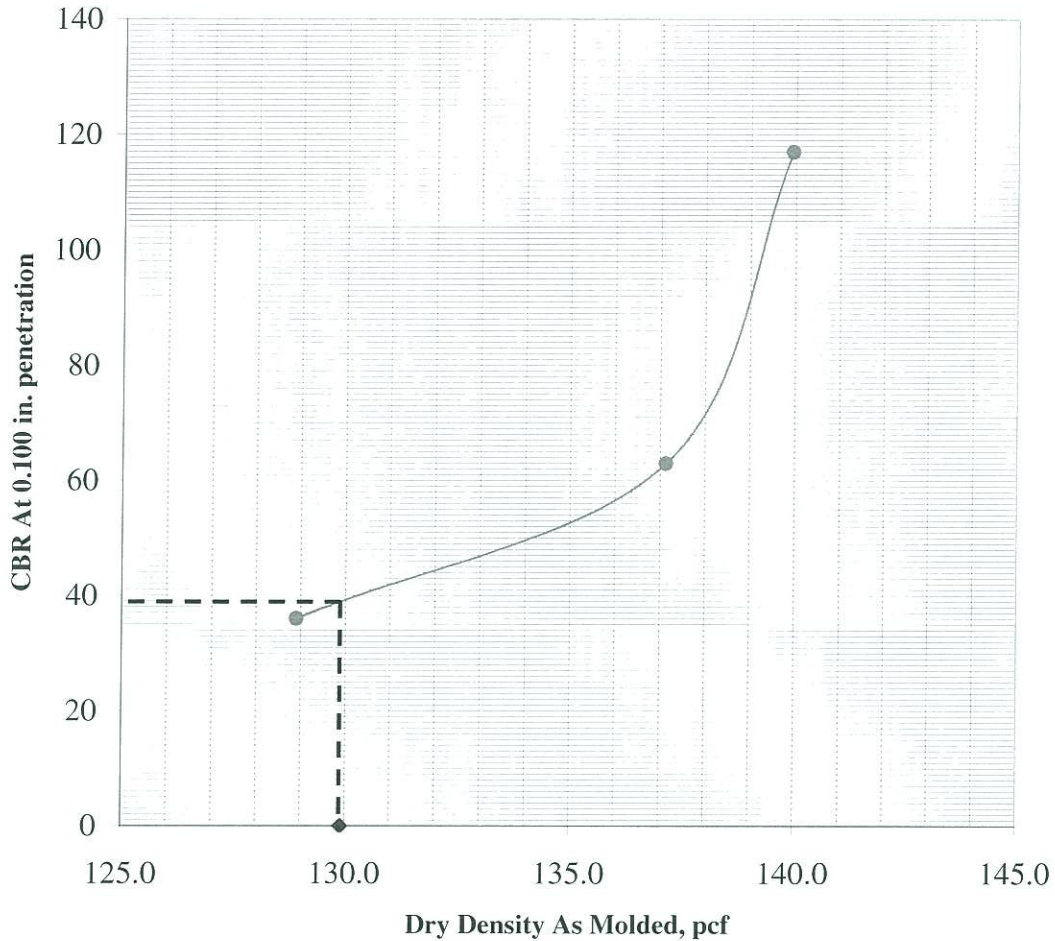
CBR At 0.1" Penetration At	95%	Compaction	40

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0003R, S01

SAMPLE DESCRIPTION: N/A

REMARKS:

LAB NUMBER: S36232

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

SIERRA TESTING LABORATORIES, INC.

5040 Robert J. Mathews Blvd. El Dorado Hills, CA 95762

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

PROJECT NAME : CA High Speed Train, Fresno to Bakersfield		PROJECT NUMBER :	11-111
SAMPLE ID. : S0003R, S01		DEPTH :	0-5.0
LABORATORY NO. : S36232		DATE :	11/16/11
TECHNICIAN :			
MATERIAL DESCRIPTION : N/A		GROUP SYMBOL :	

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8878	8996		9194	9225		9286	9296.1		Tare Identification	
Mold Wt.	4223	4223		4227	4227		4229	4229		Wet soil + tare	
Mold ID.										Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	226.0	311.6	360.8	247.4	323.1	306.1	201.5	355.0	437.2		
Dry Soil & Tare, g	213.3	286.8	328.8	232.8	301.7	284.3	190.1	333.2	409.0	Moist. Adjustment	
Tare Wt., g	6.5	6.5	6.4	6.5	6.6	6.6	6.5	6.4	6.4	Desired Moist. Content	
Moisture , %	6.1	8.8	9.9	6.5	7.3	7.9	6.2	6.7	7.0	Wet Wt. Of Soil As Is, g	
		Avg.	9.4		Avg.	7.6		Avg.	6.8	Wt.Of Water To Add, g	
Wet Unit Wt., pcf	136.8	139.9		146.0	146.5		148.6	148.4			
Dry Unit Wt., pcf	128.9	127.9		137.1	135.8		139.9	138.7			

SATURATION DATA

Mold ID:	0.0		Mold ID:	0.0		Mold ID:	0	
Surcharge Wt.:		10	Surcharge Wt.:		10	Surcharge Wt.:		10
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
11/22/11	1:45 PM	0.4824	11/22/11	1:45 PM	0.4930	11/22/11	1:45 PM	0.2442
11/26/11	3:30 PM	0.4848	11/26/11	3:30 PM	0.4950	11/26/11	3:30 PM	0.2420
	% Swell	0.1		% Swell	0.0		% Swell	0.0

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loadring Factor:	1	Mold ID: 0.0		Loadring Factor:	1	Mold ID: 0.0		Loadring Factor:	1	Mold ID: 0	
Penetration Depth. in.	Load Dial Reading	Load. psi	Corrected Load. psi	Penetration Depth. in.	Load Dial Reading	Load. psi	Corrected Load. psi	Penetration Depth. in.	Load Dial Reading	Load. psi	Corrected Load. psi
0.025	288.4	96.1		0.025	403.7	134.6		0.025	403.7	134.6	
0.050	584.9	195		0.050	850.2	283.4		0.050	1161.7	387.2	
0.075	851.0	283.7		0.075	1317.4	439.1		0.075	2141.2	713.7	
0.100	1065.3	355.1	355	0.100	1885.0	628.3	628	0.100	3129.0	1043	1170
0.125	1256.4	418.8		0.125	2494.6	831.5		0.125	4036.9	1345.6	
0.150	1421.3	473.8		0.150	3139.5	1046.5		0.150	4845.9	1615.3	
0.175	1569.5	523.2		0.175	3795.5	1265.2		0.175	5579.2	1859.7	
0.200	1701.3	567.1	567	0.200	4461.2	1487.1	1487	0.200	6230.8	2076.9	2170
0.300	2167.6	722.5		0.300	6982.2	2327.4		0.300	8418.2	2806.1	
0.400	2519.6	839.9		0.400	9040.2	3013.4		0.400	9399.4	3133.1	
0.500	2838.2	946.1		0.500	10997.9	3666		0.500	9859.9	3286.6	

Standard Sress. psi	Penetration Depth. in.	Bearing Ratio	Standard Sress. psi	Penetration Depth. in.	Bearing Ratio	Standard Sress. psi	Penetration Depth. in.	Bearing Ratio
1000	0.100	36	1000	0.100	63	1000	0.100	117
1500	0.200	38	1500	0.200	99	1500	0.200	145

CALIFORNIA BEARING RATIO

CBR At 0.1" Penetration At 95% Compaction 20

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0004R, S01
SAMPLE DESCRIPTION: N/A   LAB NUMBER: S36239
REMARKS:

PROJECT NUMBER:	11-111	November 16, 2011	
			CA High Speed Train, Fresno to Bakersfield

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd. El Dorado Hills. CA 95762

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.
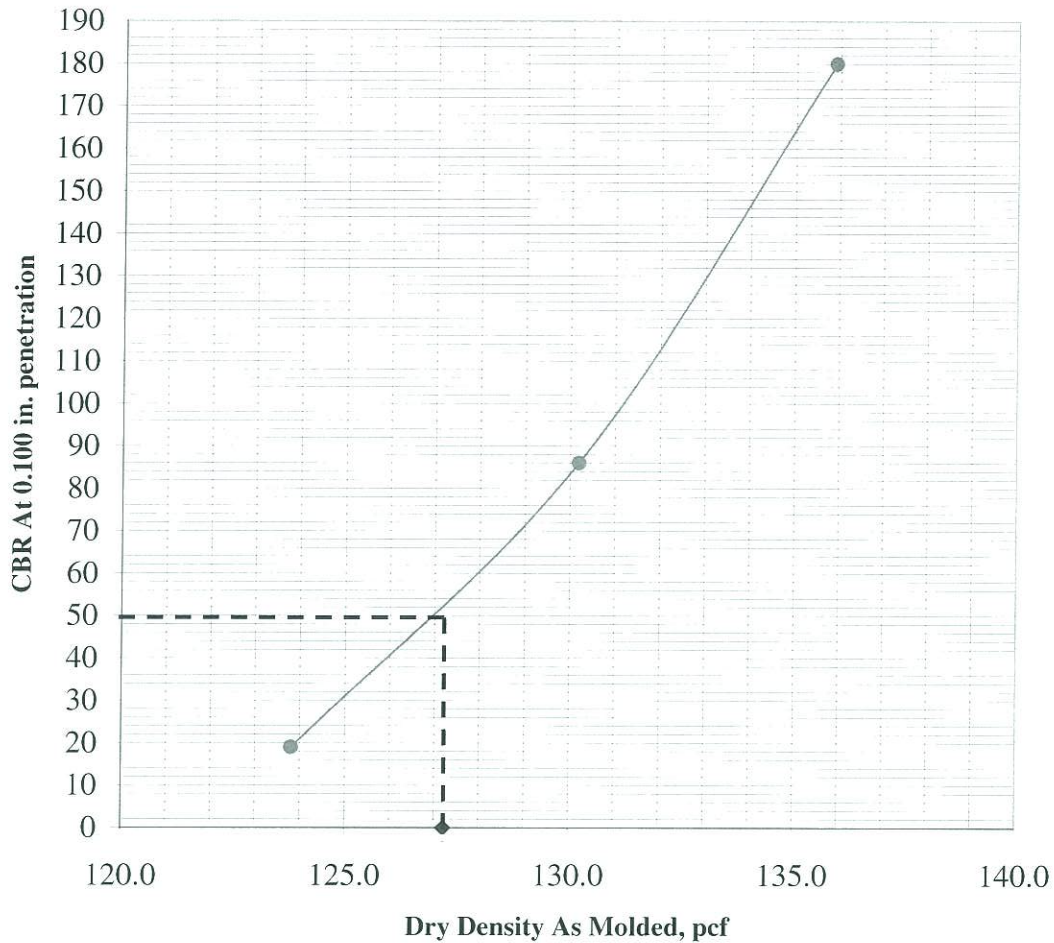GEOTECHNICAL AND MATERIALS TESTING SERVICES

PROJECT NAME : CA High Speed Train, Fresno to Bakersfield	PROJECT NUMBER : 11-111
SAMPLE ID. : S0003R, S01	DEPTH : 0-5.0
LABORATORY NO. : S36232	DATE : 11/16/11
TECHNICIAN :	
MATERIAL DESCRIPTION : N/A	GROUP SYMBOL :

Number of Blows	10			25			56			Moist. Adjustment Calcs.		
	Before Test	After Test Top	Bottom	Before Test	After Test Top	Bottom	Before Test	After Test Top	Bottom	Initial Moist. Content		
Wt. Of Mold and Soil	8878	8996		9194	9225		9286	9296.1				
Mold Wt.	4223	4223		4227	4227		4229	4229		Tare Identification		
Mold ID.										Wet soil + tare		
MOISTURE DATA										Dry soil + tare		
Tare Identification										Tare		
Wet Soil & Tare, g	226.0	311.6	360.8	247.4	323.1	306.1	201.5	355.0	437.2	Moisture content %		
Dry Soil & Tare, g	213.3	286.8	328.8	232.8	301.7	284.3	190.1	333.2	409.0	Moist. Adjustment		
Tare Wt., g	6.5	6.5	6.4	6.5	6.6	6.6	6.5	6.4	6.4	Desired Moist. Content		
Moisture , %	**6.1**	**8.8**	**9.9**	**6.5**	**7.3**	**7.9**	**6.2**	**6.7**	**7.0**	Wet Wt. Of Soil As Is, g		
		Avg.	**9.4**		Avg.	**7.6**		Avg.	**6.8**	Wt.Of Water To Add, g		
Wet Unit Wt., pcf	**136.8**	**139.9**		**146.0**	**146.5**		**148.6**	**148.4**				
Dry Unit Wt., pcf	**128.9**	**127.9**		**137.1**	**135.8**		**139.9**	**138.7**				

SATURATION DATA

Mold ID: 0.0			Mold ID: 0.0			Mold ID: 0		
Surcharge Wt.: 10			Surcharge Wt.: 10			Surcharge Wt.: 10		
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
11/22/11	1:45 PM	0.4824	11/22/11	1:45 PM	0.4930	11/22/11	1:45 PM	0.2442
11/26/11	3:30 PM	0.4848	11/26/11	3:30 PM	0.4950	11/26/11	3:30 PM	0.2420
	% Swell	0.1		% Swell	0.0		% Swell	0.0

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loading Factor: 1	Mold ID: 0.0			Loading Factor: 1	Mold ID: 0.0			Loading Factor: 1	Mold ID: 0		
Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	288.4	96.1		0.025	403.7	134.6		0.025	403.7	134.6	
0.050	584.9	195		0.050	850.2	283.4		0.050	1161.7	387.2	
0.075	851.0	283.7		0.075	1317.4	439.1		0.075	2141.2	713.7	
0.100	1065.3	355.1	355	0.100	1885.0	628.3	628	0.100	3129.0	1043	1170
0.125	1256.4	418.8		0.125	2494.6	831.5		0.125	4036.9	1345.6	
0.150	1421.3	473.8		0.150	3139.5	1046.5		0.150	4845.9	1615.3	
0.175	1569.5	523.2		0.175	3795.5	1265.2		0.175	5579.2	1859.7	
0.200	1701.3	567.1	567	0.200	4461.2	1487.1	1487	0.200	6230.8	2076.9	2170
0.300	2167.6	722.5		0.300	6982.2	2327.4		0.300	8418.2	2806.1	
0.400	2519.6	839.9		0.400	9040.2	3013.4		0.400	9399.4	3133.1	
0.500	2838.2	946.1		0.500	10997.9	3666		0.500	9859.9	3286.6	

Standard Sress. psi	Penetration Depth. in.	Bearing Ratio	Standard Sress. psi	Penetration Depth. in.	Bearing Ratio	Standard Sress. psi	Penetration Depth. in.	Bearing Ratio
1000	0.100	36	1000	0.100	63	1000	0.100	117
1500	0.200	38	1500	0.200	99	1500	0.200	145

CALIFORNIA BEARING RATIO

CBR At 0.1" Penetration At	95%	Compaction	50

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0005R, S01
SAMPLE DESCRIPTION: N/A
REMARKS:

LAB NUMBER: S36245

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

SILRRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd. El Dorado Hills. CA 95762

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

PROJECT NAME : CA High Speed Train, Fresno to Bakersfield	PROJECT NUMBER :	11-111
SAMPLE ID. : S0005R, S01	DEPTH :	0-5.0
LABORATORY NO. : S36245	DATE :	11/16/11
TECHNICIAN :		
MATERIAL DESCRIPTION : N/A	GROUP SYMBOL :	

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8696	8871		8917	9060		9121	9202		Tare Identification	
Mold Wt.	4224	4224		4227	4227		4229	4229		Wet soil + tare	
Mold ID.		1			3			4		Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	294.3	381.3	344.1	284.1	402.8	410.0	279.0	383.5	396.7		
Dry Soil & Tare, g	277.6	348.9	315.2	268.7	373.2	378.9	264.1	360.5	371.2	Moist. Adjustment	
Tare Wt., g	6.5	41.3	52.0	6.4	51.5	51.6	6.8	53.0	50.1	Desired Moist. Content	
Moisture , %	6.2	10.5	11.0	5.9	9.2	9.5	5.8	7.5	7.9	Wet Wt. Of Soil As Is. g	
		Avg.	10.8		Avg.	9.4		Avg.	7.7	Wt.Of Water To Add. g	
Wet Unit Wt., pcf	131.4	136.3		137.8	141.7		143.8	145.8			
Dry Unit Wt., pcf	123.8	123.1		130.2	129.4		135.9	135.1			

SATURATION DATA								
Mold ID:	1.0		Mold ID:	3.0		Mold ID:	4	
Surcharge Wt.:	10		Surcharge Wt.:	10		Surcharge Wt.:	10	
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
11/27/11	3:15 PM	0.4903	11/27/11	3:15 PM	0.2277	11/27/11	3:15 PM	0.4931
12/1/11	5:15 PM	0.4966	12/1/11	5:15 PM	0.2330	12/1/11	5:15 PM	0.4969
	% Swell	0.1		% Swell	0.1		% Swell	0.1

PENETRATION DATA											
Piston Diameter, in.: 1.956				Piston Area: 3							
Loadring Factor:	1	Mold ID: 1.0		Loadring Factor:	1	Mold ID: 3.0		Loadring Factor:	1	Mold ID: 4	
Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	178.8	59.6		0.025	790.9	263.6		0.025	1105.6	368.5	
0.050	282.6	94.2		0.050	1445.9	482		0.050	2445.2	815.1	
0.075	417.7	139.2		0.075	2062.9	687.6		0.075	3772.5	1257.5	
0.100	567.6	189.2	189	0.100	2570.4	856.8	857	0.100	5001.6	1667.2	1800
0.125	692.0	230.7		0.125	2968.4	989.5		0.125	6051.6	2017.2	
0.150	796.7	265.6		0.150	3272.4	1090.8		0.150	6941.8	2313.9	
0.175	887.3	295.8		0.175	3507.2	1169.1		0.175	7721.2	2573.7	
0.200	967.2	322.4	322	0.200	3648.9	1216.3	1216	0.200	8417.4	2805.8	2890
0.300	1248.1	416		0.300	3849.1	1283		0.300	10720.9	3573.6	
0.400	1481.3	493.8		0.400	4308.0	1436		0.400			
0.500	1671.6	557.2		0.500	4852.5	1617.5		0.500			

Standard Sress. psi	Penetration Depth. in.	Bearing Ratio		Standard Sress. psi	Penetration Depth. in.	Bearing Ratio		Standard Sress. psi	Penetration Depth. in.	Bearing Ratio
1000	0.100	19		1000	0.100	86		1000	0.100	180
1500	0.200	21		1500	0.200	81		1500	0.200	193

CALIFORNIA BEARING RATIO
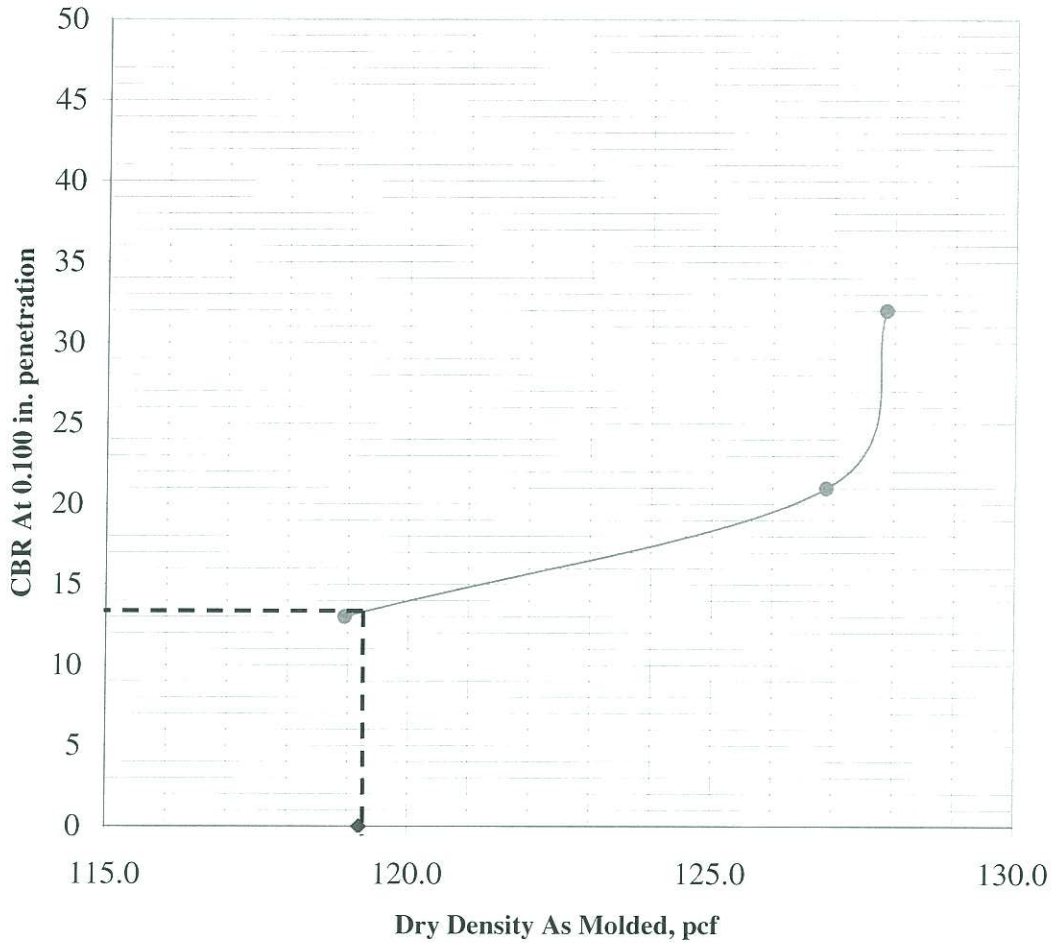
| CBR At 0.1" Penetration At | 95% | Compaction | 13 |

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0013AR, S01
SAMPLE DESCRIPTION: N/A
REMARKS:

LAB NUMBER: S36271

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

SIERRA TESTING LABORATORIES, INC.
SOIL, CLINICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd. El Dorado Hills, CA 95762

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

|	
PROJECT NAME : CA High Speed Train, Fresno to Bakersfield	PROJECT NUMBER : 11-111
SAMPLE ID. : S0013AR, S01	DEPTH : 0-5.0
LABORATORY NO. : S36271	DATE : 11/16/11
TECHNICIAN :	
MATERIAL DESCRIPTION :	GROUP SYMBOL :

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8667	8867		8903	8939		8986	9005		Tare Identification	
Mold Wt.	4226	4226		4180	4180		4208	4208		Wet soil + tare	
Mold ID.										Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	315.0	360.2	344.3	360.2	348.3	347.7	351.6	347.7	334.5		
Dry Soil & Tare, g	291.7	333.7	311.0	333.7	318.9	315.1	324.8	317.4	304.8	Moist. Adjustment	
Tare Wt., g	52.2	51.6	51.8	51.6	51.7	40.4	51.9	40.9	51.3	Desired Moist. Content	
Moisture , %	**9.7**	**9.4**	**12.8**	**9.4**	**11.0**	**11.9**	**9.8**	**11.0**	**11.7**	Wet Wt. Of Soil As Is. g	
		Avg.	11.1		Avg.	11.4		Avg.	11.3	Wt.Of Water To Add. g	
Wet Unit Wt., pcf	**130.5**	**136.1**		**138.8**	**139.3**		**140.4**	**140.7**			
Dry Unit Wt., pcf	**118.9**	**122.5**		**126.9**	**124.6**		**127.9**	**125.9**			

SATURATION DATA

Mold ID: 0.0			Mold ID: 0.0			Mold ID: 0		
Surcharge Wt.: 10			Surcharge Wt.: 10			Surcharge Wt.: 10		
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
12/10/11	2:30 PM	0.2770	12/10/11	2:30 PM	0.3058	12/10/11	2:30 PM	0.2735
12/14/11	4:55 PM	0.2821	12/14/11	4:55 PM	0.3037	12/14/11	4:55 PM	0.2787
	% Swell	0.1		% Swell	0.0		% Swell	0.1

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loadring Factor: 1		Mold ID: 0.0		Loadring Factor: 1		Mold ID: 0.0		Loadring Factor: 1		Mold ID: 0	
Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	45.3	15.1		0.025	163.9	54.6		0.025	56.8	18.9	
0.050	83.2	27.7		0.050	318.0	106		0.050	129.3	43.1	
0.075	132.6	44.2		0.075	472.1	157.4		0.075	242.2	80.7	
0.100	192.8	64.3	130	0.100	620.4	206.8	207	0.100	397.9	132.6	320
0.125	266.1	88.7		0.125	761.2	253.7		0.125	589.9	196.6	
0.150	353.4	117.8		0.150	897.2	299.1		0.150	804.1	268	
0.175	445.7	148.6		0.175	1023.2	341.1		0.175	1032.3	344.1	
0.200	542.1	180.7	260	0.200	1143.5	381.2	381	0.200	1268.7	422.9	615
0.300	921.1	307		0.300	1566.2	522.1		0.300	2214.5	738.2	
0.400	1314.1	438		0.400	1895.7	631.9		0.400	3090.3	1030.1	
0.500	1730.1	576.7		0.500	2183.2	727.7		0.500	3890.3	1296.8	

Standard Sress. psi	Penetration Depth. in.	Bearing Ratio	Standard Sress. psi	Penetration Depth. in.	Bearing Ratio	Standard Sress. psi	Penetration Depth. in.	Bearing Ratio
1000	0.100	13	1000	0.100	21	1000	0.100	32
1500	0.200	17	1500	0.200	25	1500	0.200	41

CALIFORNIA BEARING RATIO

CBR At 0.100 in. penetration (y-axis)

Dry Density As Molded, pcf (x-axis)
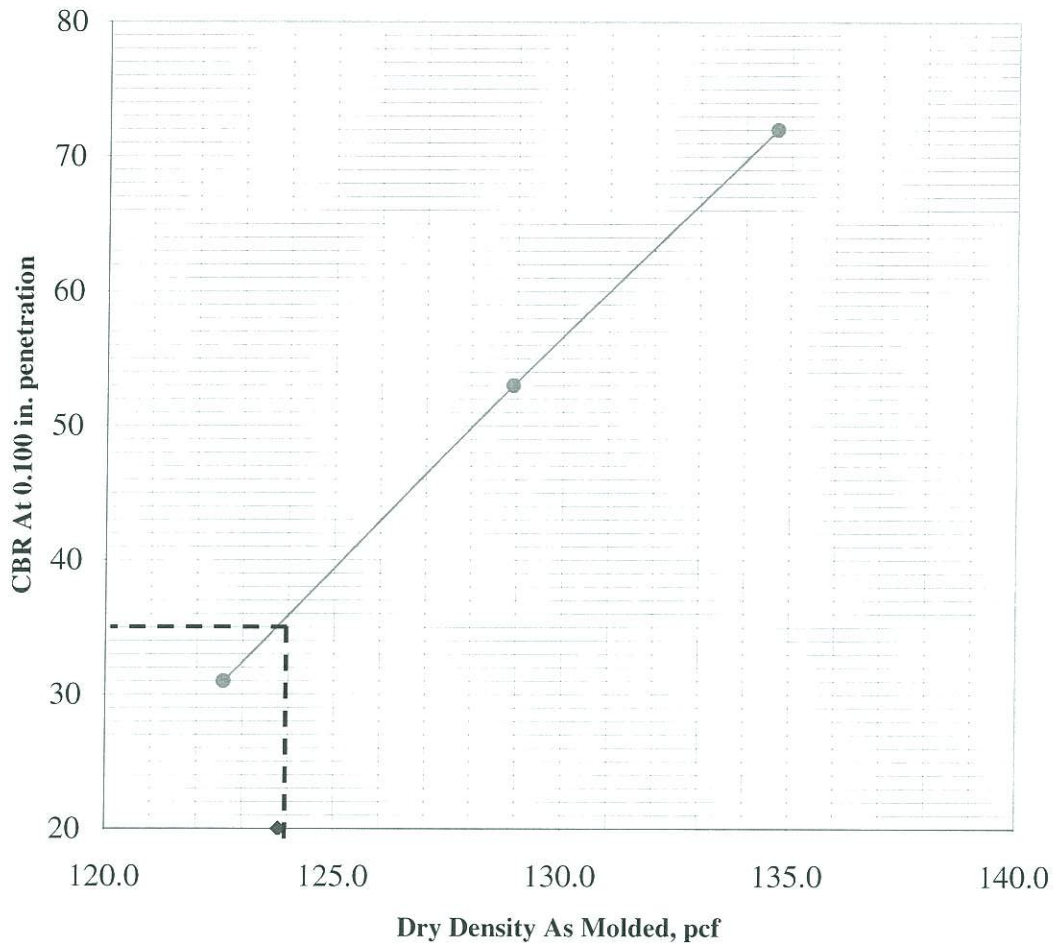
CBR At 0.1" Penetration At	95%	Compaction	35

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0015R, S01
SAMPLE DESCRIPTION: N/A
REMARKS:

LAB NUMBER: S36286

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

CALIFORNIA BEARING RATIO
WORKSHEET

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

PROJECT NAME :	CA High Speed Train, Fresno to Bakersfield		PROJECT NUMBER :	11-111
SAMPLE ID. :	S0015R, S01		DEPTH :	0-5.0
LABORATORY NO. :	S36286		DATE :	11/16/11
TECHNICIAN :				
MATERIAL DESCRIPTION :	N/A		GROUP SYMBOL :	

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8730	8932		8969	9059		9181	9213		Tare Identification	
Mold Wt.	4228	4228		4223	4223		4227	4227		Wet soil + tare	
Mold ID.										Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	255.6	374.4	383.6	345.3	364.0	363.2	367.0	334.8	363.7		
Dry Soil & Tare, g	240.6	343.3	350.4	323.1	335.7	334.8	343.4	311.1	337.2	Moist. Adjustment	
Tare Wt., g	51.6	52.2	52.1	52.4	50.9	51.8	52.1	40.4	42.7	Desired Moist. Content	
Moisture , %	**7.9**	**10.7**	**11.1**	**8.2**	**9.9**	**10.0**	**8.1**	**8.8**	**9.0**	Wet Wt. Of Soil As Is, g	
		Avg.	10.9		Avg.	10.0		Avg.	8.9	Wt.Of Water To Add, g	
Wet Unit Wt., pcf	**132.3**	**138.0**		**139.5**	**141.8**		**145.6**	**146.3**			
Dry Unit Wt., pcf	**122.6**	**124.4**		**128.9**	**128.9**		**134.7**	**134.2**			

SATURATION DATA

Mold ID:	0.0		Mold ID:	0.0		Mold ID:	0	
Surcharge Wt.:	10		Surcharge Wt.:	10		Surcharge Wt.:	10	
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
12/10/11	2:30 PM	0.4769	12/10/11	2:30 PM	0.2379	12/10/11	2:30 PM	0.4977
12/14/11	4:55 PM	0.4840	12/14/11	4:55 PM	0.2430	12/14/11	4:55 PM	0.5047
	% Swell	0.2		% Swell	0.1		% Swell	0.2

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loadring Factor: 1   Mold ID: 0.0   Loadring Factor: 1   Mold ID: 0.0   Loadring Factor: 1   Mold ID: 0

Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	360.0	120		0.025	539.6	179.9		0.025	329.5	109.8	
0.050	601.4	200.5		0.050	949.1	316.4		0.050	809.9	270	
0.075	781.0	260.3		0.075	1286.9	429		0.075	1338.8	446.3	
0.100	926.0	308.7	309	0.100	1594.2	531.4	531	0.100	1896.5	632.2	720
0.125	1038.1	346		0.125	1870.2	623.4		0.125	2446.0	815.3	
0.150	1131.2	377.1		0.150	2120.6	706.9		0.150	2984.0	994.7	
0.175	1213.5	404.5		0.175	2343.1	781		0.175	3489.9	1163.3	
0.200	1279.5	426.5	427	0.200	2540.0	846.7	847	0.200	3952.1	1317.4	1380
0.300	1482.9	494.3		0.300	3157.0	1052.3		0.300	5594.8	1864.9	
0.400	1651.0	550.3		0.400	3533.5	1177.8		0.400	7088.5	2362.8	
0.500	1805.9	602		0.500	3880.4	1293.5		0.500	8380.3	2793.4	

Standard Sress, psi	Penetration Depth, in.	Bearing Ratio	Standard Sress, psi	Penetration Depth, in.	Bearing Ratio	Standard Sress, psi	Penetration Depth, in.	Bearing Ratio
1000	0.100	31	1000	0.100	53	1000	0.100	72
1500	0.200	28	1500	0.200	56	1500	0.200	92

CALIFORNIA BEARING RATIO
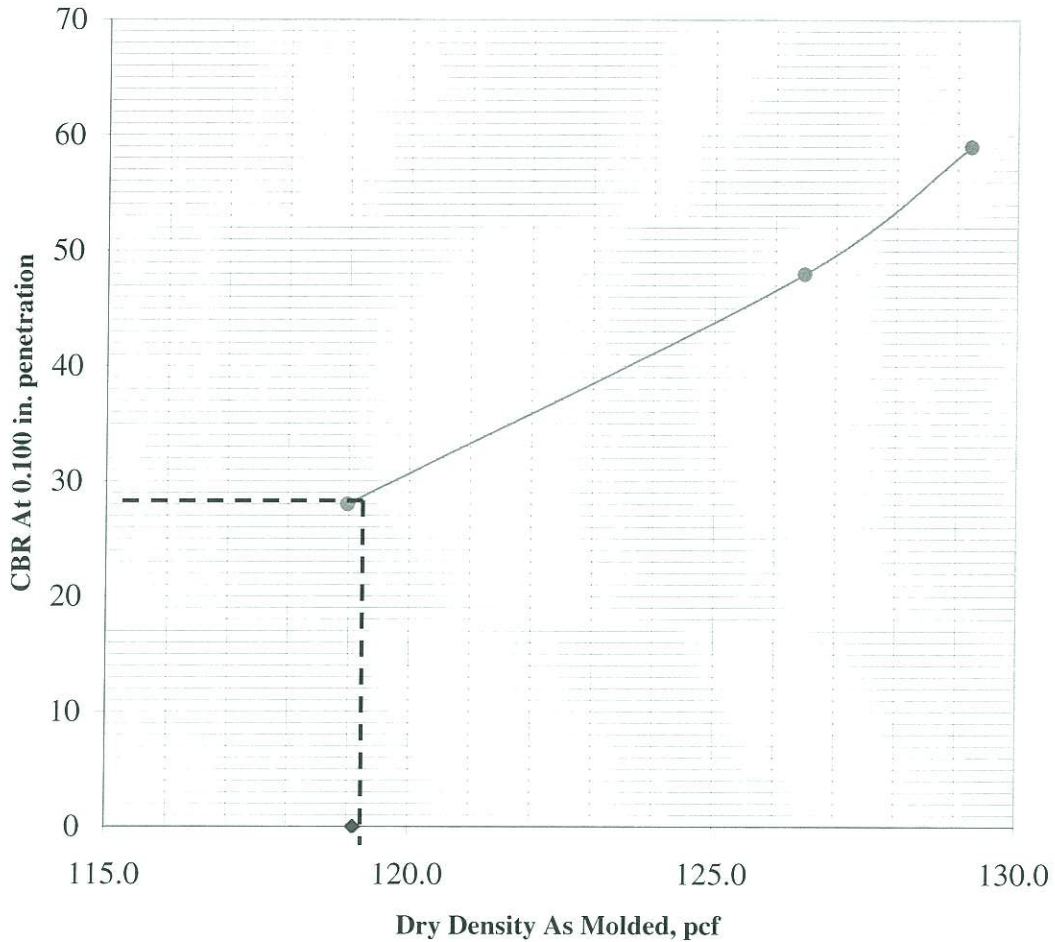
| CBR At 0.1" Penetration At | 95% | Compaction | 28 |

SAMPLE IDENTIFICATION: S0017R, S01
SAMPLE DESCRIPTION: N/A
REMARKS:

LAB NUMBER: S36303

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd. El Dorado Hills, CA 95762

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES
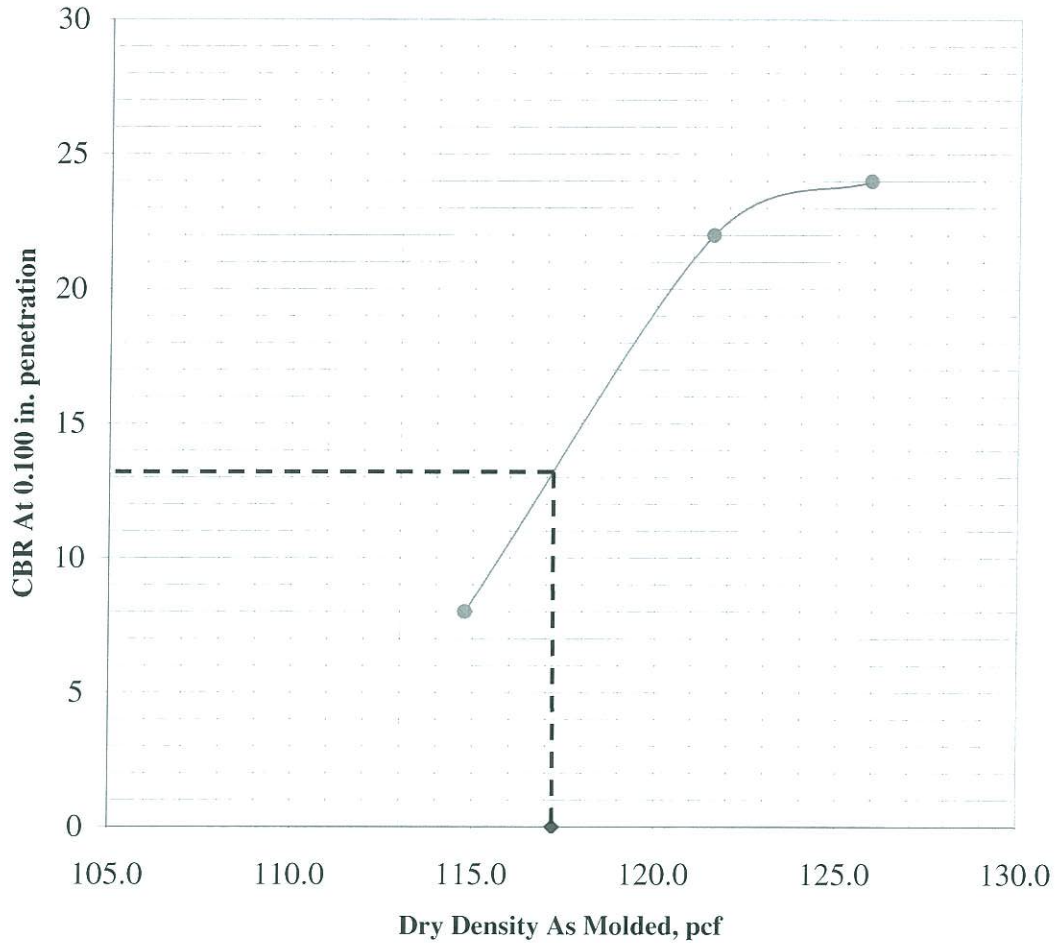
PROJECT NAME : CA High Speed Train, Fresno to Bakersfield	PROJECT NUMBER :	11-111
SAMPLE ID. : S0017R, S01	DEPTH :	0-5.0
LABORATORY NO. : S36303	DATE :	11/16/11
TECHNICIAN :		
MATERIAL DESCRIPTION : N/A	GROUP SYMBOL :	

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8562	8770		8833	8869		8942	8966		Tare Identification	
Mold Wt.	4222	4222		4198	4198		4228	4228		Wet soil + tare	
Mold ID.										Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	357.8	347.2	386.9	301.9	352.6	342.1	300.0	358.8	360.3		
Dry Soil & Tare, g	337.2	312.4	349.5	284.0	324.6	313.9	282.6	331.0	332.3	Moist. Adjustment	
Tare Wt., g	51.4	49.8	54.9	51.6	50.7	51.3	41.2	41.8	52.0	Desired Moist. Content	
Moisture , %	7.2	13.3	12.7	7.7	10.2	10.7	7.2	9.6	10.0	Wet Wt. Of Soil As Is, g	
		Avg.	13.0		Avg.	10.5		Avg.	9.8	Wt. Of Water To Add, g	
Wet Unit Wt., pcf	127.6	133.5		136.2	136.9		138.5	138.8			
Dry Unit Wt., pcf	119.0	118.2		126.5	123.6		129.2	126.2			

SATURATION DATA

Mold ID:	0.0		Mold ID:	0.0		Mold ID:	0	
Surcharge Wt.:	10		Surcharge Wt.:	10		Surcharge Wt.:	10	
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
12/10/11	2:30 PM	0.2248	12/10/11	2:30 PM	0.5052	12/10/11	2:30 PM	0.3550
12/14/11	4:55 PM	0.2348	12/14/11	4:55 PM	0.5058	12/14/11	4:55 PM	0.3560
	% Swell	0.2		% Swell	0.0		% Swell	0.0

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loadring Factor: 1		Mold ID: 0.0		Loadring Factor: 1		Mold ID: 0.0		Loadring Factor: 1		Mold ID: 0	
Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	309.8	103.3		0.025	192.0	64		0.025	79.1	26.4	
0.050	519.9	173.3		0.050	497.6	165.9		0.050	188.7	62.9	
0.075	687.9	229.3		0.075	935.9	312		0.075	392.2	130.7	
0.100	824.7	274.9	275	0.100	1426.1	475.4	475	0.100	675.6	225.2	590
0.125	935.1	311.7		0.125	1950.9	650.3		0.125	1034.8	344.9	
0.150	1019.9	340		0.150	2473.2	824.4		0.150	1449.2	483.1	
0.175	1099.9	366.6		0.175	2964.2	988.1		0.175	1914.6	638.2	
0.200	1171.5	390.5	391	0.200	3400.1	1133.4	1133	0.200	2387.5	795.8	1200
0.300	1473.1	491		0.300	4852.5	1617.5		0.300	4126.7	1375.6	
0.400	1646.9	549		0.400	5767.8	1922.6		0.400	5671.4	1890.5	
0.500	1854.5	618.2		0.500	6097.4	2032.5		0.500	6960.0	2320	

Standard Sress, psi	Penetration Depth, in.	Bearing Ratio		Standard Sress, psi	Penetration Depth, in.	Bearing Ratio		Standard Sress, psi	Penetration Depth, in.	Bearing Ratio
1000	0.100	28		1000	0.100	48		1000	0.100	59
1500	0.200	26		1500	0.200	76		1500	0.200	80

CALIFORNIA BEARING RATIO
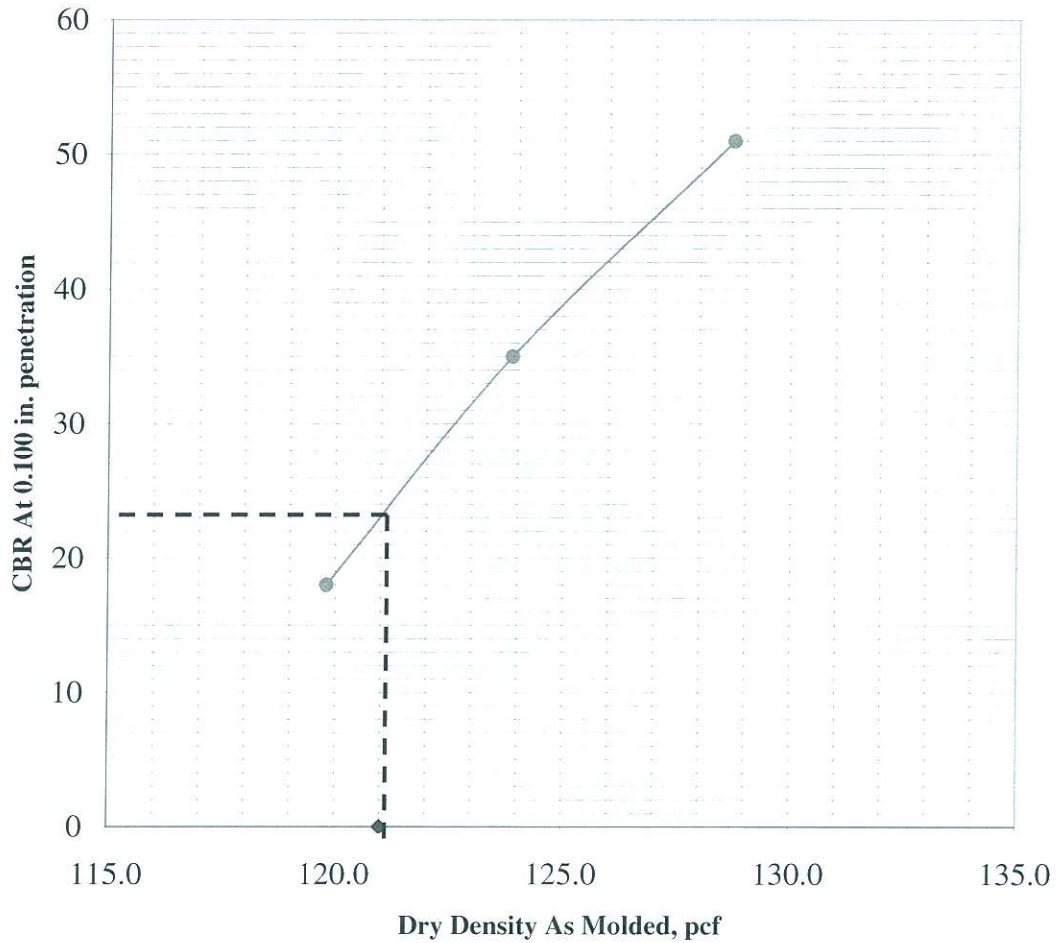
CBR At 0.1" Penetration At	95%	Compaction	23

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0018R, S01
SAMPLE DESCRIPTION: N/A
REMARKS:

LAB NUMBER: S36314

PROJECT NUMBER: **11-111**   November 16, 2011

CA High Speed Train, Fresno to Bakersfield

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd. El Dorado Hills. CA 95762

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

PROJECT NAME : CA High Speed Train, Fresno to Bakersfield		PROJECT NUMBER :	11-111
SAMPLE ID. : S0018R, S01		DEPTH :	0-5.0
LABORATORY NO. : S36314		DATE :	11/16/11
TECHNICIAN :			
MATERIAL DESCRIPTION : N/A		GROUP SYMBOL :	

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before	After Test		Before	After Test		Before	After Test		Initial Moist. Content	
	Test	Top	Bottom	Test	Top	Bottom	Test	Top	Bottom		
Wt. Of Mold and Soil	8637	8712		8837	8887		8933	8956		Tare Identification	
Mold Wt.	4209	4209		4263	4263		4180	4180		Wet soil + tare	
Mold ID.										Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	334.7	382.7	357.4	372.4	407.3	477.5	317.5	344.2	390.0		
Dry Soil & Tare, g	312.2	348.4	323.3	347.3	373.8	435.2	296.6	317.9	358.9	Moist. Adjustment	
Tare Wt., g	51.3	51.4	42.0	52.7	46.8	45.3	51.0	52.3	51.5	Desired Moist. Content	
Moisture , %	**8.6**	**11.5**	**12.1**	**8.5**	**10.2**	**10.8**	**8.5**	**9.9**	**10.1**	Wet Wt. Of Soil As Is. g	
		Avg.	11.8		Avg.	10.5		Avg.	10.0	Wt.Of Water To Add, g	
Wet Unit Wt., pcf	**130.1**	**132.0**		**134.4**	**135.6**		**139.7**	**140.0**			
Dry Unit Wt., pcf	**119.8**	**118.1**		**123.9**	**122.4**		**128.7**	**127.1**			

SATURATION DATA								
Mold ID: 0.0			Mold ID: 0.0			Mold ID: 0		
Surcharge Wt.: 10			Surcharge Wt.: 10			Surcharge Wt.: 10		
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
12/12/11	5:00 PM	0.4857	12/12/11	5:00 PM	0.3349	12/12/11	5:00 PM	0.2781
12/16/11	4:55 PM	0.4895	12/16/11	4:55 PM	0.3414	12/16/11	4:55 PM	0.2797
	% Swell	0.1		% Swell	0.1		% Swell	0.0

PENETRATION DATA											
Piston Diameter, in.: 1.956				Piston Area: 3							
Loading Factor: 1	Mold ID: 0.0			Loading Factor: 1	Mold ID: 0.0			Loading Factor: 1	Mold ID: 0		
Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth, in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	159.8	53.3		0.025	169.3	56.4		0.025	77.4	25.8	
0.050	295.8	98.6		0.050	421.8	140.6		0.050	190.3	63.4	
0.075	427.6	142.5		0.075	732.4	244.1		0.075	376.5	125.5	
0.100	547.0	182.3	182	0.100	1062.8	354.3	354	0.100	635.2	211.7	510
0.125	643.4	214.5		0.125	1408.0	469.3		0.125	951.6	317.2	
0.150	725.8	241.9		0.150	1754.0	584.7		0.150	1313.2	437.7	
0.175	803.3	267.8		0.175	2081.1	693.7		0.175	1706.2	568.7	
0.200	878.2	292.7	293	0.200	2385.9	795.3	795	0.200	2117.2	705.7	1020
0.300	1140.2	380.1		0.300	3494.8	1164.9		0.300	3682.7	1227.6	
0.400	1487.9	496		0.400	4464.5	1488.2		0.400	5083.2	1694.4	
0.500	1679.8	559.9		0.500	5323.8	1774.6		0.500	6361.8	2120.6	

Standard Sress. psi	Penetration Depth, in.	Bearing Ratio	Standard Sress. psi	Penetration Depth, in.	Bearing Ratio	Standard Sress. psi	Penetration Depth, in.	Bearing Ratio
1000	0.100	18	1000	0.100	35	1000	0.100	51
1500	0.200	20	1500	0.200	53	1500	0.200	68

CALIFORNIA BEARING RATIO

Y-axis: CBR At 0.100 in. penetration (0 to 30)
X-axis: Dry Density As Molded, pcf (105.0 to 130.0)

CBR At 0.1" Penetration At	95%	Compaction	13

Test Method: ASTM D1883

SAMPLE IDENTIFICATION: S0019R, S01

SAMPLE DESCRIPTION: N/A

REMARKS:

Lab Number: S36325

Group Symbol: N/A

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

CALIFORNIA BEARING RATIO

WORKSHEET

SIERRA TESTING LABORATORIES, INC.

PROJECT NAME : CA High Speed Train, Fresno to Bakersfield	PROJECT NUMBER : 11-111
SAMPLE ID. : S0019R, S01	DEPTH : 0-5.0
LABORATORY NO. : S36325	DATE : 11/16/11
TECHNICIAN :	
MATERIAL DESCRIPTION : N/A	GROUP SYMBOL : N/A

Number of Blows	10			25			56			Moist. Adjustment Calcs.	
	Before Test	After Test		Before Test	After Test		Before Test	After Test		Initial Moist. Content	
		Top	Bottom		Top	Bottom		Top	Bottom		
Wt. Of Mold and Soil	8383	8665.1		8631	8596		8783	8698		Tare Identification	
Mold Wt.	4179	4179		4182	4182		4177	4177		Wet soil + tare	
Mold ID.										Dry soil + tare	
MOISTURE DATA										Tare	
Tare Identification										Moisture content %	
Wet Soil & Tare, g	323.4	262.3	353.9	295.1	417.2	412.1	301.1	379.3	314.8		
Dry Soil & Tare, g	304.1	237.8	319.0	278.0	376.7	368.5	283.7	346.6	286.1	Moist. Adjustment	
Tare Wt., g	51.8	41.1	52.1	51.8	46.6	45.0	52.0	46.2	46.9	Desired Moist. Content	
Moisture , %	**7.6**	**12.5**	**13.1**	**7.6**	**12.3**	**13.5**	**7.5**	**10.9**	**12.0**	Wet Wt. Of Soil As Is, g	
		Avg.	**12.8**		Avg.	**12.9**		Avg.	**11.4**	Wt. Of Water To Add, g	
Wet Unit Wt., pcf	**123.6**	**131.5**		**130.8**	**129.5**		**135.4**	**132.5**			
Dry Unit Wt., pcf	**114.8**	**116.6**		**121.6**	**114.1**		**125.9**	**118.3**			

SATURATION DATA

Mold ID:	0.0		Mold ID:	0.0		Mold ID:	0	
Surcharge Wt.:		10	Surcharge Wt.:		10	Surcharge Wt.:		10
Date	Time	Dial Reading	Date	Time	Dial Reading	Date	Time	Dial Reading
1/5/12	4:00 PM	0.4940	1/5/12	4:00 PM	0.3360	1/5/12	4:00 PM	0.3568
1/9/12	4:00 PM	0.4968	1/9/12	4:00 PM	0.3420	1/9/12	4:00 PM	0.3581
	% Swell	0.1		% Swell	0.1		% Swell	0.0

PENETRATION DATA

Piston Diameter, in.: 1.956   Piston Area: 3

Loading Factor:	1	Mold ID: 0.0		Loading Factor:	1	Mold ID: 0.0		Loading Factor:	1	Mold ID: 0	
Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi	Penetration Depth. in.	Load Dial Reading	Load, psi	Corrected Load, psi
0.025	101.3	33.8		0.025	130.2	43.4		0.025	197.7	65.9	
0.050	162.3	54.1		0.050	267.8	89.3		0.050	359.2	119.7	
0.075	218.3	72.8		0.075	426.8	142.3		0.075	514.1	171.4	
0.100	280.9	93.6	80	0.100	591.5	197.2	215	0.100	711.0	237	237
0.125	347.7	115.9		0.125	751.4	250.5		0.125	933.4	311.1	
0.150	407.8	135.9		0.150	906.2	302.1		0.150	1154.2	384.7	
0.175	464.7	154.9		0.175	1054.5	351.5		0.175	1376.7	458.9	
0.200	515.7	171.9	165	0.200	1192.9	397.6	415	0.200	1582.6	527.5	528
0.300	704.4	234.8		0.300	1596.6	532.2		0.300	2323.3	774.4	
0.400	866.7	288.9		0.400	1777.1	592.4		0.400	2875.3	958.4	
0.500	1005.9	335.3		0.500	1943.5	647.8		0.500	3059.8	1019.9	

Standard Sress. psi	Penetration Depth. in.	Bearing Ratio		Standard Sress. psi	Penetration Depth. in.	Bearing Ratio		Standard Sress. psi	Penetration Depth. in.	Bearing Ratio
1000	0.100	8		1000	0.100	22		1000	0.100	24
1500	0.200	11		1500	0.200	28		1500	0.200	35

Borehole ID	Sample No.	Depth (ft)	Elevation (NAVD88) (ft)	USCS Group	pH	Minimum Resistivity (ohms-cm)	Chloride (ppm)	Sulfate (ppm)
S0001R	S01	0 - 5.0	284.9	SM	7.04	6,160	6.8	34.9
S0001R	S06B	11.0 - 11.5	276.1	ML	7.29	5,090	10.1	9.2
S0002R	S01	0 - 5.0	287.9	SM	7.38	10,720	7.9	4.2
S0002R	S05A	9.5 - 10.3	280.5	SM	7.85	2,490	8.6	6.0
S0003R	S01	0 - 5	285.5	SM	7.88	1,130	14.4	273.1
S0003R	S08	14 - 15.2	273.4	SP-SM	8.20	2,250	56.4	102.0
S0003R	S11	30 - 30.9	257.5	SP-SM	7.87	6,160	7.2	25.2
S0004R	S01	0 - 5.0	281.2	ML	7.80	2,950	8.1	7.7
S0004R	S09	20 - 21.5	262.9	ML	7.44	8,310	15.5	1.8
S0004R	S12	35 - 36.3	248.0	SM	7.16	2,630	8.5	7.7
S0005R	S01	0 - 5.0	282.8	SP-SM	7.66	17,420	9.6	0.8
S0005R	S09	20.0 - 20.8	264.9	SM	7.69	20,900	7.6	2.5
S0005R	S12	35.0 - 36.2	249.7	SP-SM	7.66	17,420	9.6	0.8
S0006R	S01	0 - 5.0	285.1	SP-SM	7.33	14,470	6.8	8.6
S0006R	S15	39.5 - 40.8	247.4	SM	7.28	3,220	9.8	18.7
S0007R	S01	0 - 5.0	282.6	SM	7.21	6,160	7.8	16.7
S0007R	S06	9.0 - 10.3	275.4	SM	8.07	3,750	16.0	21.7
S0010R	S01	0 - 5.0	283.6	SM	7.29	9,920	6.3	12.2
S0010R	S04	8.0 - 9.4	277.4	ML	7.25	1,610	14.8	30.2
S0010R	S11	30.0 - 31.2	255.5	SM	7.98	6,700	14.4	21.8
S0012R	S01	0 - 5.0	285.1	SM	7.68	8,310	6.9	3.4
S0013AR	S01	0 - 5.0	283.6	SM	6.93	3,750	11.5	15.8

TABLE E-6								
SUMMARY OF CORROSION TEST RESULTS								
Borehole ID	**Sample No.**	**Depth** **(ft)**	**Elevation (NAVD88)** **(ft)**	**USCS Group**	**pH**	**Minimum Resistivity** **(ohms-cm)**	**Chloride** **(ppm)**	**Sulfate** **(ppm)**
S0014AR	S01	0 - 5.0	282.9	ML	7.67	1,800	15.9	20.8
S0014R	S01	0 - 5.0	282.1	ML	7.47	5,360	6.2	5.4
S0014R	S03	6.5 - 7.8	277.4	SM	7.78	7,240	10.1	22.9
S0015R	S03A	6.5 - 7.0	279.9	SM	7.86	1,610	9.7	29.6
S0015R	S10	25.0 - 26.5	260.9	SM	7.75	2,010	124.0	64.2
S0016R	S01	0 - 5.0	286.3	ML	7.56	5,090	12.2	22.1
S0016R	S14	65.0 - 65.9	223.3	SP-SM	8.18	9,110	7.7	16.2
S0017R	S01	0 - 5.0	288.0	SM	8.35	4,820	7.1	25.4
S0017R	S06	25.0 - 26.0	265.0	SM	8.07	11,260	8.0	15.9
S0017R	S12	55.0 - 55.7	235.1	SM	7.88	9,380	6.8	3.3
S0018R	S01	0 - 5.0	303.3	SM	7.93	7,770	10.5	16.0
S0018R	S16	75.0 - 75.6	230.5	SM	7.94	10,450	9.6	12.6
S0018R	S20	95.0 - 96.0	210.3	SM	7.87	8,040	9.6	5.6
S0019R	S01	0 - 5.0	290.0	SM	7.31	3,220	33.8	87.9
S0019R	S03A	6.5 - 7.6	285.4	SM	7.56	4,290	19.8	76.3
				Test Standard:	ASTM D4327	ASTM G57	ASTM D4327	ASTM D4327

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S001R, S01	0-5.0	7.04	6.16	6.8	34.9
S001R, S06B	11-11.5	7.29	5.09	10.1	9.2

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	**11-111**	November 16, 2011	

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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CA High Speed Train
Fresno to Bakersfield
SA-HST019

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity Resistivity (ohm-cm x1000)	Chloride ppm	Sulfate ppm
S0002R, S01	0-5.0	7.38	10.72	7.9	4.2
S0002R, S05A	9.5-10.3	7.85	2.49	8.6	6.0

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER: **11-111** | November 16, 2011

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SA-HST019**

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity Resistivity (ohm-cm x1000)	Chloride ppm	Sulfate ppm
S0003R, S01	0-5.0	7.88	1.13	14.4	273.1
S0003R, S08	14-15.2	8.20	2.25	56.4	102.0
S0003R, S11	30-30.9	7.87	6.16	7.2	25.2

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER: **11-111** November 16, 2011

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EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S0004R, S01	0-5.0	7.80	2.95	8.1	7.7
S0004R, S09	20-21.5	7.44	8.31	15.5	1.8
S0004R, S12	35-36.3	7.16	2.63	8.5	7.7

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER: **11-111** November 16, 2011

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SA-HST019

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S0005R, S01	0-5.0	7.52	5.90	10.5	17.7
S0005R, S09	20-20.8	7.69	20.90	7.6	2.5
S0005R, S12	35-36.2	7.66	17.42	9.6	0.8

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011	

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**CA High Speed Train
Fresno to Bakersfield
SA-HST019**

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S0006R, S06	0-5.0	7.33	14.47	6.8	8.6
S0006R, S15	39.5-40.8	7.28	3.22	9.8	18.7

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011

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CA High Speed Train
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SA-HST019

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S0007R, S01	0-5.0	7.21	6.16	7.8	16.7
S0007R, S06	9-10.3	8.07	3.75	16.0	21.7

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011	

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CA High Speed Train
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SA-HST019

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S0010R, S01	0-5.0	7.29	9.92	6.3	12.2
S0010R, S04	8-9.4	7.25	1.61	14.8	30.2
S0010R, S11	30-31.2	7.98	6.70	14.4	21.8

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011	

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**CA High Speed Train
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SA-HST019**

EVALUATION FOR SOIL CORROSION

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride ppm	Sulfate ppm
S0012R, S01	0-5.0	7.68	8.31	6.9	3.4

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER: **11-111** | November 16, 2011

CA High Speed Train
Fresno to Bakersfield
SA-HST019

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EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0013AR, S01	0-5.0	6.93	3.75	11.5	15.8

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011		

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CA High Speed Train, Fresno to Bakersfield

SA-HST019

EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0014AR, S01	0-5.0	7.67	1.80	15.9	20.8

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011		

CA High Speed Train, Fresno to Bakersfield

SA-HST019

EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0014R, S01	0-5.0	7.47	5.36	6.2	5.4
S0014R, S03	6.5-7.8	7.78	7.24	10.1	22.9

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER: **11-111** | November 16, 2011

CA High Speed Train,
Fresno to Bakersfield

SA-HST019

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Phone: (916) 939-3460 FAX: (916) 939-3507

EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0015R, S08A	6.5-7.0	7.86	1.61	9.7	29.6
S0015R, S10	25-26.5	7.75	2.01	124.0	64.2

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER: **11-111** November 16, 2011	**CA High Speed Train, Fresno to Bakersfield**	
SIERRA TESTING LABORATORIES, INC. GEOTECHNICAL AND MATERIALS TESTING SERVICES	SA-HST019	
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EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0017R, S01	0-5.0	8.35	4.82	7.1	25.4
S0017R, S06	25-26.0	8.07	11.26	8.0	15.9
S0017R, S12	55-55.7	7.88	9.38	6.8	3.3

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011		

CA High Speed Train, Fresno to Bakersfield

SA-HST019

EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0018R, S01	0-5.0	7.93	7.77	10.5	16.0
S0018R, S16	75-75.6	7.94	10.45	9.6	12.6
S0018R, S20	95-96.0	7.87	8.04	9.6	5.6

Test Method: ASTM G57, D4972, D4327

EVALUATION FOR SOIL CORRISON

Sample Identification	Depth, ft.	Soil pH	Minimum Resistivity ohm-cm (x1000)	Chloride. ppm	Sulfate ppm
S0019R, S01	0-5.0	7.31	3.22	33.8	87.9
S0019R, S03A	6.5-7.6	7.56	4.29	19.8	76.3

Test Method: ASTM G57, D4972, D4327

PROJECT NUMBER:	11-111	November 16, 2011	

CA High Speed Train, Fresno to Bakersfield

SA-HST019

TABLE E-7				
SUMMARY OF GROUNDWATER CHEMISTRY TEST RESULTS				
Test	**Test Reference**	**Borehole ID**		
		S0016R	**S0017R**	**S0018R**
pH	SM 4500-H$^+$B	7.51	7.24	7.51
Calcium (mg/L)	EPA 200.7	88	78	47
Bicarbonate Alkalinity as CaCO$_3$ (mg/L)	SM 2320B	280	260	220
Specific Conductance (umhos/cm)	SM 2510B	1100	860	570
Total Dissolved Solids (mg/L)	SM 2320B	740	580	380
Chloride (mg/L)	EPA 300.0	83	49	23
Sulfate as SO$_4$ (mg/L)	EPA 300.0	53	110	21

ELAP Certificate Numbers 1551 and 2728

20 January 2012

Sierra Testing Laboratories, Inc.

Attn: Chad Walker

5040 Robert J. Mathew Parkway

El Dorado Hills, CA 95762

RE: CA High Speed Train: Fresno-Bakersfield

Work Order: 12A0515

Enclosed are the results of analyses for samples received by the laboratory on 01/12/12 22:20. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.

e-mail: clientservices@alpha-labs.com

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Service Center: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

CHEMICAL EXAMINATION REPORT

Sierra Testing Laboratories, Inc.
5040 Robert J. Mathew Parkway
El Dorado Hills, CA 95762
Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S0017R	12A0515-01	Water	01/12/12 14:40	01/12/12 22:20
S0018R	12A0515-02	Water	01/12/12 15:04	01/12/12 22:20
S0016R	12A0515-03	Water	01/12/12 15:40	01/12/12 22:20

The results in this report apply to the samples analyzed in accordance with the chain
of custody document. This analytical report must be reproduced in its entirety.

Bruce Gove
Laboratory Director

1/20/2012

Alpha Analytical Laboratories Inc.

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CHEMICAL EXAMINATION REPORT

Sierra Testing Laboratories, Inc.
5040 Robert J. Mathew Parkway
El Dorado Hills, CA 95762
Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Alpha Analytical Laboratories, Inc.

	METHOD	BATCH	PREPARED	ANALYZED	DILUTION	RESULT	PQL	NOTE
S0017R (12A0515-01)			**Sample Type: Water**			**Sampled: 01/12/12 14:40**		
Field Analyses								
pH	SM4500-H+ B	AA21648	01/12/12 14:40	01/12/12 14:40	1	**7.24 pH Units**	**1.00**	
Metals by EPA 200 Series Methods								
Calcium	EPA 200.7	AA21317	01/16/12 08:50	01/17/12 11:39	1	**78 mg/l**	**1.0**	
Conventional Chemistry Parameters by APHA/EPA Methods								
Bicarbonate Alkalinity as CaCO3	SM2320B	AA21329	01/13/12 14:17	01/13/12 17:00	1	**260 mg/l**	**5.0**	
Specific Conductance (EC)	SM2510B	"	"	"	"	**860 umhos/cm**	**20**	
Total Dissolved Solids	SM2540C	AA21626	01/16/12 10:00	01/20/12 08:45	"	**580 mg/l**	**10**	
Carbonate Alkalinity as CaCO3	SM2320B	AA21329	01/13/12 14:17	01/13/12 17:00	"	ND "	5.0	
Hydroxide Alkalinity as CaCO3	"	"	"	"	"	ND "	5.0	
Total Alkalinity as CaCO3	"	"	"	"	"	**260 "**	**5.0**	
Miscellaneous Physical/Conventional Chemistry Parameters								
Langelier Index @ Source Temp	LSI	AA21317	01/16/12 08:50	01/20/12 09:06	1	**-0.09 .**	**-10.00**	
Anions by EPA Method 300.0								
Chloride	EPA 300.0	AA21323	01/13/12 11:25	01/13/12 13:04	10	**49 mg/l**	**5.0**	
Sulfate as SO4	"	"	"	"	"	**110 "**	**5.0**	
S0018R (12A0515-02)			**Sample Type: Water**			**Sampled: 01/12/12 15:04**		
Field Analyses								
pH	SM4500-H+ B	AA21648	01/12/12 15:04	01/12/12 15:04	1	**7.51 pH Units**	**1.00**	

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Bruce Gove
Laboratory Director

1/20/2012

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CHEMICAL EXAMINATION REPORT

Sierra Testing Laboratories, Inc.
5040 Robert J. Mathew Parkway
El Dorado Hills, CA 95762
Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Alpha Analytical Laboratories, Inc.

	METHOD	BATCH	PREPARED	ANALYZED	DILUTION	RESULT	PQL	NOTE
S0018R (12A0515-02)			**Sample Type: Water**			**Sampled: 01/12/12 15:04**		
Metals by EPA 200 Series Methods								
Calcium	EPA 200.7	AA21317	01/16/12 08:50	01/17/12 12:59	1	47 mg/l	1.0	
Conventional Chemistry Parameters by APHA/EPA Methods								
Bicarbonate Alkalinity as CaCO3	SM2320B	AA21329	01/13/12 14:17	01/13/12 17:00	1	220 mg/l	5.0	
Specific Conductance (EC)	SM2510B	"	"	"	"	570 umhos/cm	20	
Total Dissolved Solids	SM2540C	AA21626	01/16/12 10:00	01/20/12 08:45	"	380 mg/l	10	
Carbonate Alkalinity as CaCO3	SM2320B	AA21329	01/13/12 14:17	01/13/12 17:00	"	ND "	5.0	
Hydroxide Alkalinity as CaCO3	"	"	"	"	"	ND "	5.0	
Total Alkalinity as CaCO3	"	"	"	"	"	220 "	5.0	
Miscellaneous Physical/Conventional Chemistry Parameters								
Langelier Index @ Source Temp	LSI	AA21317	01/16/12 08:50	01/20/12 09:06	1	-0.11 .	-10.00	
Anions by EPA Method 300.0								
Chloride	EPA 300.0	AA21323	01/13/12 11:25	01/13/12 13:34	5	23 mg/l	2.5	
Sulfate as SO4	"	"	"	01/13/12 13:50	1	21 "	0.50	
S0016R (12A0515-03)			**Sample Type: Water**			**Sampled: 01/12/12 15:40**		
Field Analyses								
pH	SM4500-H+ B	AA21648	01/12/12 15:40	01/12/12 15:40	1	7.51 pH Units	1.00	
Metals by EPA 200 Series Methods								
Calcium	EPA 200.7	AA21317	01/16/12 08:50	01/17/12 11:43	1	88 mg/l	1.0	

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Bruce Gove
Laboratory Director

1/20/2012

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CHEMICAL EXAMINATION REPORT

Sierra Testing Laboratories, Inc.
5040 Robert J. Mathew Parkway
El Dorado Hills, CA 95762
Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Alpha Analytical Laboratories, Inc.

	METHOD	BATCH	PREPARED	ANALYZED	DILUTION	RESULT	PQL	NOTE
S0016R (12A0515-03)			**Sample Type: Water**			**Sampled: 01/12/12 15:40**		
Conventional Chemistry Parameters by APHA/EPA Methods								
Bicarbonate Alkalinity as CaCO3	SM2320B	AA21329	01/13/12 14:17	01/13/12 17:00	1	**280 mg/l**	**5.0**	
Specific Conductance (EC)	SM2510B	"	"	"	"	**1100 umhos/cm**	**20**	
Total Dissolved Solids	SM2540C	AA21626	01/16/12 10:00	01/20/12 08:45	"	**740 mg/l**	**10**	
Carbonate Alkalinity as CaCO3	SM2320B	AA21329	01/13/12 14:17	01/13/12 17:00	"	ND "	5.0	
Hydroxide Alkalinity as CaCO3	"	"	"	"	"	ND "	5.0	
Total Alkalinity as CaCO3	"	"	"	"	"	**280 "**	**5.0**	
Miscellaneous Physical/Conventional Chemistry Parameters								
Langelier Index @ Source Temp	LSI	AA21317	01/16/12 08:50	01/20/12 09:06	1	**0.28 .**	**-10.00**	
Anions by EPA Method 300.0								
Chloride	EPA 300.0	AA21323	01/13/12 11:25	01/13/12 14:05	20	**83 mg/l**	**10**	
Sulfate as SO4	"	"	"	"	"	**53 "**	**10**	

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Laboratory Director

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CHEMICAL EXAMINATION REPORT

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Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Field Analyses - Quality Control

Analyte(s)	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AA21648 - Field Analysis										
Duplicate (AA21648-DUP1)		**Source: 12A0406-02**		Prepared & Analyzed: 01/09/12						
pH	6.63	1.00	pH Units		6.63			0.00	20	

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Bruce Gove
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1/20/2012

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CHEMICAL EXAMINATION REPORT

Sierra Testing Laboratories, Inc.
5040 Robert J. Mathew Parkway
El Dorado Hills, CA 95762
Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AA21317 - Metals Digest										
Blank (AA21317-BLK1)				Prepared: 01/13/12 Analyzed: 01/16/12						
Calcium	ND	1.0	mg/l							
LCS (AA21317-BS1)				Prepared: 01/13/12 Analyzed: 01/16/12						
Calcium	7.12	1.0	mg/l	8.00		88.9	85-115			
Duplicate (AA21317-DUP1)	Source: 12A0494-01			Prepared: 01/13/12 Analyzed: 01/16/12						
Calcium	23.1	1.0	mg/l		22.1			4.45	20	
Matrix Spike (AA21317-MS1)	Source: 12A0494-01			Prepared: 01/13/12 Analyzed: 01/16/12						
Calcium	29.7	1.0	mg/l	8.00	22.1	95.7	70-130			
Matrix Spike (AA21317-MS2)	Source: 12A0515-02			Prepared: 01/16/12 Analyzed: 01/17/12						
Calcium	55.5	1.0	mg/l	8.00	47.2	104	70-130			
Matrix Spike Dup (AA21317-MSD1)	Source: 12A0494-01			Prepared: 01/13/12 Analyzed: 01/16/12						
Calcium	29.3	1.0	mg/l	8.00	22.1	90.7	70-130	1.35	20	

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Bruce Gove
Laboratory Director

1/20/2012

Alpha Analytical Laboratories Inc.

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Service Center: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

CHEMICAL EXAMINATION REPORT

Sierra Testing Laboratories, Inc.
5040 Robert J. Mathew Parkway
El Dorado Hills, CA 95762
Attn: Chad Walker

Report Date: 01/20/12 13:05
Project No: 131577
Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AA21329 - General Preparation										
Duplicate (AA21329-DUP1)			**Source: 12A0536-01**		Prepared & Analyzed: 01/13/12					
Specific Conductance (EC)	825	20	umhos/cm		820			0.608	10	
Bicarbonate Alkalinity as CaCO3	490	5.0	mg/l		500			2.02	20	
Carbonate Alkalinity as CaCO3	ND	5.0	"		ND				20	
Hydroxide Alkalinity as CaCO3	ND	5.0	"		ND				20	
Total Alkalinity as CaCO3	490	5.0	"		500			2.02	20	
Batch AA21626 - General Preparation										
Blank (AA21626-BLK1)					Prepared: 01/16/12 Analyzed: 01/20/12					
Total Dissolved Solids	ND	10	mg/l							
Duplicate (AA21626-DUP1)			**Source: 12A0515-02**		Prepared: 01/16/12 Analyzed: 01/20/12					
Total Dissolved Solids	368	10	mg/l		380			3.21	30	
Duplicate (AA21626-DUP2)			**Source: 12A0537-01**		Prepared: 01/16/12 Analyzed: 01/20/12					
Total Dissolved Solids	4800	10	mg/l		4830			0.498	30	

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Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
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Anions by EPA Method 300.0 - Quality Control

Analyte(s)	Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AA21323 - General Preparation										
Blank (AA21323-BLK1)				Prepared & Analyzed: 01/13/12						
Sulfate as SO4	ND	0.50	mg/l							
Chloride	ND	0.50	"							
LCS (AA21323-BS1)				Prepared & Analyzed: 01/13/12						
Chloride	10.9	0.50	mg/l	11.1		98.4	90-110			
Sulfate as SO4	21.6	0.50	"	22.2		97.4	90-110			
Duplicate (AA21323-DUP1)		**Source: 12A0518-03**		Prepared & Analyzed: 01/13/12						
Chloride	13.3	0.50	mg/l		13.3			0.136	20	
Sulfate as SO4	28.9	0.50	"		28.7			0.437	20	
Matrix Spike (AA21323-MS1)		**Source: 12A0518-03**		Prepared & Analyzed: 01/13/12						
Chloride	23.4	2.5	mg/l	11.1	13.3	91.5	80-120			
Sulfate as SO4	49.2	2.5	"	22.2	28.7	91.9	80-120			
Matrix Spike (AA21323-MS2)		**Source: 12A0515-02**		Prepared & Analyzed: 01/13/12						
Chloride	34.2	2.5	mg/l	11.1	22.8	102	80-120			
Sulfate as SO4	42.2	2.5	"	22.2	20.5	97.4	80-120			
Matrix Spike Dup (AA21323-MSD1)		**Source: 12A0518-03**		Prepared & Analyzed: 01/13/12						
Sulfate as SO4	49.2	2.5	mg/l	22.2	28.7	92.1	80-120	0.0904	20	
Chloride	24.4	2.5	"	11.1	13.3	99.9	80-120	3.91	20	

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Project ID: CA High Speed Train: Fresno-Bakersfield

Order Number	Receipt Date/Time	Client Code	Client PO/Reference
12A0515	01/12/2012 22:20	CV SIERRA	11-111

Notes and Definitions

DET   Analyte DETECTED

ND   Analyte NOT DETECTED at or above the reporting limit

NR   Not Reported

dry   Sample results reported on a dry weight basis

RPD   Relative Percent Difference

PQL   Practical Quantitation Limit

Chain of Custody Record

Reports and invoices will be delivered by e-mail in .pdf format.

Lab No. **12A055**   Page ____ of ____

Report to:
Company: Arup
Attn: Brandon Klezniak
Address: 560 Mission St. Suite 700
Phone/Fax: 415-963-3853
E-mail Address: brandon.klezniak@arup.com
Samplers Signature: B Klezniak
Print: Brandon Klezniak

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
E-mail Address:

Project Info for Report:
Project Name: California High-Speed Train
Project No: 131577
PO/Reference:

Signature below authorizes work under terms stated on reverse side.

Analyses Requested: Langelier (Index), Chloride, Sulfate, Field pH meter

TAT: 10 days, Rush: 5 days, 48 hours, Other: ____ days
Lab Approval Required For Rush TATs

Sample Notes or CDPH Source Numbers:
Field pH — Field Test

Sample Identification	Sampled Date	Time	Matrix	Total Number of Containers	Field pH	Notes
S0017R	1/12/12	2:40 pm	Water	1	7.24	21.7 °C
S0018R	1/12/12	3:04 pm	Water	1	7.51	20.1 °C
S0016R	1/12/12	3:40 pm	Water	1	7.51	22.3 °C

Log in under Client
Sierra Testing Laboratories
for David ARUP's Consulting

Relinquished by:	Received by:	Date	Time
B Klezniak		01/12/11	19:00
R. Lucero		1/12/12	1015
Lab Runner		1-12-12	2120

Sample Seals: Y / N
Custody Seals: Y / N

Preservative: HCL, HNO3, H2SO4, Other, None
Container: 40ml VOA, Poly, Amber, Sleeve, Other